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# HELMINTHOLOGICAL ABSTRACTS

*A quarterly review of world literature on helminths and their vectors especially in relation to veterinary, medical and plant pathology, soil science, fisheries, fresh-water and marine zoology, taxonomy and geographical distribution.*



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The earlier arrangement by which abstracts of the literature published in each year were brought into a single volume when bound terminates with the completion of Volume 27 (1958).

Volume 28 Part 1 contained abstracts of such literature published in 1959 as came to hand before September of that year. The remaining parts are being compiled from 1959 references and the supplementary titles of helminthological books and articles which came to the attention of the Bureau too late for inclusion in the relevant annual volume under the old scheme.

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# HELMINTHOLOGICAL ABSTRACTS

Vol. 30, Part 4

## ABSTRACTS

When an address accompanies an abstract, it is that of the first author.

### MEDICAL HELMINTHOLOGY

#### Trematoda

**2098**—ANON., 1957. "African Conference on Bilharziasis, Brazzaville, French Equatorial Africa, 26 November–8 December 1956. Report." **World Health Organization. Technical Report Series**, No. 139, 42 pp.

A conference on schistosomiasis held at Brazzaville in French Equatorial Africa in November–December 1956 was attended by 33 individuals including five from the U.S.A., eight from European countries, 14 from African countries and two from the Philippines, together with four members of the Secretariat of WHO Regional Office for Africa and the Secretary of the Endemo-epidemic Diseases of WHO at Geneva. 62 papers (not reproduced) were considered. This anonymous report indicates where *Schistosoma haematobium* and *S. mansoni* infections are either prevalent or patchy in distribution and their relative importance in public health. The factors influencing their epidemiology, the various control measures being applied, questions relating to the international co-ordination of control and research, the exchange of information and the training of personnel were discussed. A useful table compares the susceptibility of certain African and European strains of laboratory-bred Planorbidae and Bulinae to the various strains of African mammalian schistosomes. A provisional map gives the distribution of human schistosomiasis in Africa so far as was known at the time of the Conference

R. T. Leiper

**2099**—ANON., 1961. "Antimony and the heart." [Annotation.] **British Medical Journal**, Year 1961, 1 (5240), 1665–1666.

**2100**—AWWAAD, S., NAGATY, H. F., ELGUINDY, M. & RIFAAT, M. A., 1960. [Pediatric Department, Ein-Shams University, Cairo, Egypt.] "TWSb in treating urinary bilharziasis in Egyptian children." **Journal of Tropical Medicine and Hygiene**, 63 (9), 204–205.

20 children aged between six and 13 years were treated for *Schistosoma haematobium* with 0.04 gm. of TWSb per kg. of body-weight. The treatment consisted of five intramuscular injections given to one group of patients daily, to another group every other day and to a third group twice weekly. All cases were cured within two to three weeks of the start of treatment; however, during a follow-up of two months, one of the cases given the drug daily showed a relapse. Vomiting, the most common side effect of the drug, may be prevented by giving 0.25 gm. of mercaptosuccinic acid 15 minutes before each injection. Significant ECG changes developed in all cases and were most marked in those who received the drug daily. Awwaad *et al.* consider it inadvisable to give TWSb on consecutive days; courses of twice-weekly doses seem to be equally effective, safer and less likely to be followed by a relapse.

J. W. Smith



- \*2101—BIAGI, F., SOTO, R., DORANTES, S., CASTREJÓN, O. & PORTILLA, J., 1957. "Dos casos de fasciolosis en su período inicial como problema de diagnóstico." *Boletín Médico del Hospital Infantil. Mexico*, **14** (5), 533-544.
- 2102—DARRAS, T. ET AL., 1960. [Instituut voor Tropische Geneeskunde, Antwerpen, Belgium. "Een nieuw Congolees geval van longparagonimose." *Annales de la Société Belge de Médecine Tropicale*, **40** (5), 725-731. [English, French, German & Spanish summaries p. 730.]  
The authors review the few records of human *Paragonimus* infection from Africa pointing out that very few adult trematodes have been recovered but that at least two genera may be involved—*Paragonimus* and *Poikilorchis* [see also Helm. Abs., **26**, Nos. 27f & 65c] and that practically nothing is known of their aetiology in Africa. The condition may be commoner than it would appear to be from the records since examination of sputum for ova is not a routine procedure in most laboratories. A clinical case is described and the similarity of the symptoms to those of tuberculosis is stressed. W. M. Fitzsimmons
- 2103—FORSYTH, D. M., 1961. [Kuwait Oil Co., Southwell Hospital, Ahmadi, Kuwait.] "Practical difficulties in the treatment of schistosomiasis in an Arab community, Part II." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (2), 168-177.  
Of the various methods of treating schistosomiasis, a six-day course of sodium antimonyl gluconate proved the most effective when given on consecutive days in a daily dose of 225 mg. to patients weighing 54 kg. or more. That it is highly toxic, however, is shown by the death of at least one of the patients. Lucanthone hydrochloride gave poor results. R. T. Leiper
- 2104—FRIEDHEIM, E. A. H. & DE JONGH, R. T., 1959. "The effect of a single dose of TWSb in urinary bilharziasis: suggestions for a suppressive management of bilharziasis." *Annals of Tropical Medicine and Parasitology*, **53** (3), 316-324.  
0.4 gm. or 0.5 gm. of TWSb injected intramuscularly into 20 patients of various ages infected with *Schistosoma haematobium* stopped the excretion of viable eggs in the urine within three to 25 days; the drug was well tolerated. Since at least a month elapsed before the excretion of eggs was resumed, the possibility of regular injections of TWSb which would remove the source of infection and relieve the patient of haematuria and dysuria is feasible. However, such problems as the size of the dose, the optimum time interval between doses and the possibility of acquired drug resistance by the schistosome must first be investigated. Schistosome eggs suspended in urine from an uninfected person, who had been given a single intramuscular injection of 1.0 gm. of TWSb, hatched normally. J. W. Smith
- 2105—FRIPP, P. J., 1960. [Medical School, Makerere College, Kampala, Uganda.] "Schistosomiasis and urinary  $\beta$ -glucuronidase activity." [Correspondence.] *Nature. London*, **188** (4749), 507-508.  
Fripp found that the  $\beta$ -glucuronidase activity of the urine of patients infected with *Schistosoma mansoni* or *S. haematobium* was above the normal range. Activity was reduced after successful treatment with anthelmintics. W. P. Rogers
- 2106—KAGAN, I. G., PELLEGRINO, J. & MEMORIA, J. M. P., 1961. [U.S. Department of Health, Public Health Service, Communicable Disease Center, Atlanta, Georgia, U.S.A.] "Studies on the standardization of the intradermal test for the diagnosis of bilharziasis." *American Journal of Tropical Medicine and Hygiene*, **10** (2), 200-207.  
Infants, children and adults infected with *Schistosoma mansoni* were injected intradermally with 0.05 ml. of antigen containing 20 to 60 gamma nitrogen per ml., the wheal was measured after 15 minutes and areas of 1.0 sq. cm. or more were recorded as positive reactions. Providing the nitrogen was adjusted to equal values antigens prepared in the U.S.A. and Brazil and by four methods showed equal reactivity. Children under five years were not satisfactory subjects. Girls reacted less strongly than boys and the response on the back of women was equal to that on the arm of men. The sensitivity on the arm was 75% whereas that on the back was 92%. S. Willmott



- 2107—MARILL, F. G., 1960. "Essai de détection de la bilharziose à *Schistosoma haematobium* par intradermo-réaction, au cours d'une enquête épidémiologique en Haute-Volta." **Bulletin de la Société de Pathologie Exotique**, 53 (3), 416-420.

Using an antigen supplied by Alves, Marill has tested the efficacy of the intradermal test in the diagnosis of schistosomiasis haematobia at Houndé, Upper Volta. Details of this technique are given; the antigen was injected to form a papule about 3 mm. in diameter and readings were made, at first, exactly 15 minutes later and latterly at 12, 15 and 18 minutes. 463 persons, mainly children and adolescents were examined. Of 200 passing eggs of *Schistosoma haematobium* in the urine 90 were negative or doubtful and 110 were positive, of 15 not passing eggs but with haematuria two were negative or doubtful and 13 were positive, and of 248 with neither eggs nor haematuria 175 were negative or doubtful and 73 were positive. It is possible that infections had remained undetected in this last group, as only one urine examination was made, and that some were infected with *S. mansoni*. The results are discussed and it is pointed out that the short time which elapsed between injection and reading the results is a great disadvantage, particularly for those working single-handed. S. Willmott

- 2108—MIYAZAKI, I., 1961. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [Human paragonimiasis.] **Fukuoka Acta Medica**, 52 (2), 130-134. [In Japanese: English summary p. 134.]

Miyazaki gives a diagrammatic representation of the life-cycle of *Paragonimus westermani*. Annotated photomicrographs are given of the following: the cuticular spines and adults of *P. ohirai* and *P. westermani*, metacercariae of *P. westermani* in the gills and musculature of *Eriocheir japonicus*, and the pathology of four cases of human paragonimiasis. A map shows the distribution of *P. westermani* in Japan. J. W. Smith

- 2109—MURAKAMI, F. ET AL., 1960. [Clinical Department, Research Institute of Endemics, Nagasaki University, Nagasaki, Japan.] [A fatal case of pulmonary paragonimiasis with antero-septal infarction, caused by emetine hydrochloride.] **Endemic Diseases Bulletin of Nagasaki University**, 2 (4), 277-280. [In Japanese: English summary p. 280.]

- 2110—NAGATY, H. F., RIFAAT, M. A. & EL BOROLOSSY, A. W., 1960. [Department of Endemic Diseases, Faculty of Medicine, University of Ein-shams, Cairo, Egypt.] "Synergism between antimony (tartar emetic) and thioxanthone compounds in the treatment of schistosomiasis." **Journal of Tropical Medicine and Hygiene**, 63 (9), 199-203.

20 of 21 cases of *Schistosoma haematobium* in human patients were cured after treatment with daily doses of 10 mg. of lucanthone hydrochloride per kg. body-weight and 1.0 mg. of tartar emetic per kg. body-weight given together for 12 days; this combined therapy was more effective and caused less marked side effects than the same daily doses of either drug given alone for the same number of days. Treatment of human schistosomiasis in 14 patients with a daily dose of 14 mg. of Ciba 17581 per kg. body-weight was unsuccessful in each case and caused many unpleasant side effects of a gastro-intestinal and renal nature. 22 patients were cured of human schistosomiasis when given a daily dose of 35 mg. of Ciba 17581 per kg. for five days in combination with a daily dose of 1.0 mg. of tartar emetic per kg. for 12 days; this combined therapy caused milder and less frequent side effects than those caused by either drug given alone. J. W. Smith

- 2111—ROSANELLI, J. D., 1960. [Medical Department, Jinja, Uganda.] "Some observations on vesical schistosomiasis in Acholi District, Uganda. Work carried out at the Uganda Medical Department's Hospital at Gulu and in Acholi District." **East African Medical Journal**, 37 (2), 113-116.

Although the district of Lango in Uganda has long been known to be heavily infected with *Schistosoma haematobium*, cases were hardly ever reported from the neighbouring district of Acholi until recently, although the environmental conditions were very similar. A small focus of infection has now been discovered in and around the villages of Odek and Dino on the Odek river. Some of the snails found in this river were identified as *Physopsis nasuta* and contained bifurcate cercariae but no animal experiments were made to obtain the adults. In the schoolchildren a simple tube test for haemoglobin in the urine sufficed to detect



almost all those infected with *S. haematobium* and was a reliable guide for mass treatment. Where spleen rates for malaria surveys are made the possibility of splenomegaly and hepatomegaly due to *S. haematobium* should be taken into account. R. T. Leiper

- 2112.—SADUN, E. H. & BUCK, A. A., 1960. [Department of Medical Zoology, Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D.C., U.S.A.] "Paragonimiasis in South Korea—immunodiagnostic, epidemiologic, clinical, roentgenologic and therapeutic studies." *American Journal of Tropical Medicine and Hygiene*, 9 (6), 562–599.

This extensive study of paragonimiasis in southern Korea is accompanied by 21 tables and 24 text figures. Intradermal tests with an acid-soluble protein fraction of adult *Paragonimus westermani* were carried out on over 3,000 individuals and gave positive reactions in all those with proved infections. In those with both paragonimiasis and clonorchiasis the dermal reaction to the *Paragonimus* antigen was greater. In about 40% of the positive reactors eggs could be found in the sputum by a single examination. Leucocytosis and eosinophilia were present only in the early stages of infection. The highest rate of prevalence and of intensity of infection occurred in the age group 25 to 35 years. Treatment with 40 gm. to 100 gm. of chloroquine proved more effective in the earlier than the later stages but only 12.5% of those treated were apparently cured. As an alternative to chemotherapy, surgical interference often proved effective not only in brain lesions but also in acute abdominal and chronic pulmonary cases. Epidemiological studies on two islands off the southern tip of the Korean peninsula showed that the areas of heavy endemicity were in the neighbourhood of mountain streams where crabs and crayfish were abundant. R. T. Leiper

- 2113.—SHINOHARA, T., 1960. [Department of Parasitology, Kurume University School of Medicine, Kurume, Japan.] [Surveys on paragonimiasis at Kadogawa Town, Miyazaki Prefecture, and on intermediate hosts in some rivers of its neighbourhood.] *Journal of the Kurume Medical Association*, 23 (7), 2820–2823. [In Japanese: English summary p. 2823.]

- \*2114.—TERZIEV, G. ET AL., 1957. [The course of pulmonary paragonimiasis.] *Klinicheskaya Meditsina. Moscow*, 35 (12), 60–65. [In Russian.]

- 2115.—TSUTSUMI, H. ET AL., 1960. [Department of Pathology, Kurume University School of Medicine, Kurume, Japan.] [A case of subcutaneous nodule of *Paragonimus westermani*.] *Journal of the Kurume Medical Association*, 23 (3), 1093–1095. [In Japanese: English summary p. 1095.]

- 2116.—WADDY, B. B., 1961. [London School of Hygiene & Tropical Medicine, London, W.C.1., England.] "Schistosomiasis: a major public health problem." *Span. London*, 4 (3), 129–132.

## Cestoda

- 2117.—AKHUNBAEV, I. K. & VOLOKH, Y. A., 1961. [Study by electrophoresis of the serum proteins in patients with endemic goitre and echinococcosis.] *Khirurgiya. Moscow*, 37 (5), 79–81. [In Russian.]

- 2118.—DANILOV, I. V., 1961. [Ten operations on patients with echinococcosis.] *Khirurgiya. Moscow*, 37 (4), 126–127. [In Russian.]

- 2119.—DONCKASTER, R. & DONOSO, F., 1960. [Departamento de Parasitología, Universidad de Chile, Chile.] "Dos casos de teniasis múltiple." *Boletín Chileno de Parasitología*, 15 (4), 83–84. [English summary p. 83.]

A boy aged nine years was found to harbour six *Taenia solium* and at least one *T. saginata* and a woman aged eighteen years harboured seven *T. solium*. It is thought that this phenomenon of the presence of more than one *Taenia* is probably due to ingestion of several embryos at one meal. W. M. Fitzsimmons



**2120**—LAIRD, M. & MEEROVITCH, E., 1961. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Parasites from Northern Canada. I. Entozoa of Fort Chimo Eskimos." *Canadian Journal of Zoology*, **39** (1), 63–67.

Laird & Meerovitch examined 46 Fort Chimo Eskimos and found 46% infected with intestinal parasites of one or more species (both protozoa and helminths). 28% were infected with *Diphyllobothrium* sp. Human infections of *Diphyllobothrium* are presumably derived from the important food fish *Salvelinus alpinus*, its source of infection being unknown. Vik's study of the life-cycle of *D. norvegicum* [for abstract see Helm. Abs., **30**, No. 1788] indicates possible intermediaries. A single examination of the perianal skin of 16 Eskimo children revealed no *Enterobius* eggs. J. W. Smith

**2121**—MIYAZAKI, I., 1960. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [Four kinds of human diseases in Japan caused by the larval tapeworms.] *Fukuoka Acta Medica*, **51** (2), 131–135. [In Japanese: English summary p. 135.]

This paper consists of 17 annotated photographs and photomicrographs of *Echinococcus granulosus*, *E. multilocularis*, *E. unilocularis*, *Cysticercus cellulosae*, *Diphyllobothrium mansonii* and *Sparganum proliferum* either isolated from their human hosts or *in situ*. J. W. Smith

**2122**—MOORE, D. V. & CONNELL, F. H., 1960. [Department of Microbiology, University of Texas Southwestern Medical School, Dallas, Texas, U.S.A.] "Additional records of *Dipylidium caninum* infections in children in the United States with observations on treatment." *American Journal of Tropical Medicine and Hygiene*, **9** (6), 604–605.

The number of recorded instances of *Dipylidium caninum* in man in the U.S.A. is now raised from 9 to 13, most of which were in children. Three of the new cases were treated successfully with atebrin (0.5 gm.). The fourth case received dithiazanine iodide 50 mg. t.i.d. in banana for five days and in this case the worms were apparently digested *in situ*.

R. T. Leiper

**2123**—STRANSKY, E. & LORENZO, A. S., 1960. [Department of Pediatrics, College of Medicine, University of the Philippines, UP-PGH Medical Centre, Philippines.] "On raillietiniasis in the Philippines." *Acta Tropica. Basle*, **17** (1), 80–83.

A two-year-old boy from Cavite and an eight-month-old boy from Manila were found infected with *Raillietina garrisoni*; this infection was last reported from the Philippines in 1934. The only observable symptom of infection was the passage of proglottides with the stool. The elder child continued to pass proglottides after receiving 250 mg. of chloroquine diphosphate; further treatment with 500 mg. of chloroquine diphosphate given two weeks later was successful. The source of infection may have been dung beetles, locusts or *Cummindiana* sp. all of which can act as intermediate hosts of the worm. J. W. Smith

## Nematoda

**2124**—BOURREL, P., 1960. [Hôpital du Point-"G", Bamako, French Sudan.] "Gangrène du scrotum par élimination massive de filaires de Médine." *Médecine Tropicale*, **20** (3), 382–383.

**2125**—BROWNE, S. G., 1961. "The localization of onchocercosmata." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (3), 258–262.

The localization of palpable onchocercal tumours in 5,989 individuals in the Oriental Province of the Congo is tabulated to show that 91.7% of the tumours occurred in the pelvic girdle area, 1.1% on the legs, 1.1% on the lumbar vertebrae and abdominal wall, 5.9% in the region of the shoulder girdle and 0.2% on the head. One factor contributing to these localizations is the arrest of the migrating larval worms by pressure over bony prominences (where over 99.5% of these tumours occur) and by the bundles of fibro-connective tissue in the dermis and the connective tissue strands binding the corium to the underlying fascia. R. T. Leiper



- 2126—BRYGOO, E. R. & GRJEBINE, A., 1958. "Enquête sur la filariose des habitants de la côte sud-est de Madagascar." *Mémoires de l'Institut Scientifique de Madagascar. Série E.*, 9, 307-314.

The incidence of microfilariae (predominantly *Wuchereria bancrofti* var. *vauclai*) in the blood of persons more than ten years old was: in Fort Carnot 47 positive of 301 examined; in Ifanadiana ten positive, 136 examined; in the Manakara region, Lohorano village five positive, 59 examined, and Ifaho village 23 positive, 58 examined; in the Vangaindrano region, of those housed in the medical compound 15 positive, 47 examined, Ampasinakoho village 30 positive, 99 examined, and Ampasimalemy village 25 positive, 100 examined. Periodicity was nocturnal and the degree of infection was considerable. Elephantiasis, mainly of the lower limbs, was present in from 0.01% to 0.66% of the populations studied in Ifanadiana, Manakara and Fort Carnot.

S. Willmott

- 2127—BULLOCK, W. L., 1961. [Department of Zoology, University of New Hampshire, Durham, N.H., U.S.A.] "Two cases of human ascariasis in New Hampshire." *Journal of Parasitology*, 47 (1), 103.

- \*2128—BUMBALO, T. S. & PLUMMER, L. J., 1957. "Piperazine (Antepar) in the treatment of pin-worm and roundworm infections." *Medical Clinics of North America*, 41 (2), 575-585.

- 2129—BURNETT, G. F. & MATAIKA, J. U., 1961. [Filariasis Research Unit, Fiji.] "Mass-administration of diethylcarbamazine citrate in preventing transmission of aperiodic human filariasis." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (2), 178-187.

In an attempt to interrupt the transmission of non-periodic filariasis in Fiji by mass administration of diethylcarbamazine in doses of 6 mg. per kg. body-weight weekly for six weeks, the mean microfilarial rate was reduced from 12.2% to 2.7% and the mean microfilarial density from 4.048 to 0.36 after five months; no mature infections were found in the vector species.

R. T. Leiper

- 2130—DÍAZ, M., KUSCEVIC, T., CANTÍN, F. & HAMEDE, D., 1960. [Departamento de Parasitología, Universidad de Chile, Chile.] "Encuesta de triquinosis en un pueblo cordillerano (Los Cipreses)." *Boletín Chileno de Parasitología*, 15 (4), 72-73. [English summary p. 72.]

57.5% of the population of a small village in the Andes (Chile) reacted positively to Bachman's intradermal test for trichinelliasis.

W. M. Fitzsimmons

- 2131—DING, L. K. & SUTLIVE, J., 1960. [Christ Hospital, Kapit, Sarawak, Borneo.] "The use of dithiazanine iodide in the treatment of multiple helminthiasis in Sarawak, Borneo." *American Journal of Tropical Medicine and Hygiene*, 9 (5), 503-505.

35 patients of various ages with multiple infections of *Ascaris lumbricoides*, *Trichuris trichiura* and *Ancylostoma duodenale* were treated with 200 mg. of dithiazanine iodide daily for either one, two, three, four or five days. The over-all reductions in egg counts in trichuriasis and ascariasis were 45% and 55% respectively. The drug showed very little activity against hookworm; in 20 patients with hookworm treated for five days there was an unaccountable over-all increase in the egg counts of 70%. 18 of the 35 patients complained of side effects, especially nausea and vomiting. Ding & Sutlive conclude that dithiazanine appears to be unsuitable for mass treatment in Borneo.

J. W. Smith

- 2132—FANCI, U., 1958. [Istituto d'Igiene dell'Università di Firenze, Italy.] "Indagini sulla diffusione dell'anchilostomiasi in Abruzzo." *Annali della Sanità Pubblica. Rome*, 19 (4), 809-841. [English, French, German & Spanish summaries pp. 832-836.]

Studies on the dissemination of ancylostomiasis in Abruzzo brought to light various factors favouring its spread; it is found most frequently in the provinces of Chieti and Teramo. The incidence of the disease was greatly influenced by the physico-chemical characters of the soil and the climatic and topographic conditions. A major role was played by such factors as the nature of the crops cultivated and the habits and economic conditions of the inhabitants. The author makes some recommendations for controlling the infection.

N. Jones



**2133**—FENIGSEN, R. & OLSZEWSKA, K., 1961. [Klinika Chorób Wewnętrznych A.M., Łódź, Poland.] "Filariosis loa—opis przypadku." [Loiasis—a case report.] **Wiadomości Parazytologiczne**, 7 (2), 139–141. [English summary p. 141.]

**2134**—FOY, H. & KONDI, A., 1960. [Wellcome Trust Laboratories, Nairobi, Kenya.] "Hookworms in the aetiology of tropical iron deficiency anaemia. Radio-isotope studies." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (5), 419–433.

In Kenya both *Ancylostoma duodenale* and *Necator americanus* occur in most patients suffering from hookworm infection. Up to 850 *A. duodenale* and 2,400 *N. americanus* have been evacuated after multiple dosing with vermifuges. The amount of intestinal blood and iron loss, estimated with  $\text{Cr}^{51}$  and  $\text{Fe}^{59}$ , showed that removal of the worms reduced the blood loss to nil but did not improve the haemoglobin level unless iron therapy was given also; this did not cure the anaemia unless the worms were removed. An adequate diet did not reduce the chance of infection or reduce blood loss. The measures recommended to reduce worm loads and the accompanying anaemia are the use of footwear, improvement of sanitation, fortification of diet with iron and vermifuge campaigns.

R. T. Leiper

**2135**—GHYSELS, G. & SARTIAUX, P., 1959. [Institut de Médecine Tropicale "Princesse Astrid", Leopoldville, Congo.] "Le traitement de l'ankylostomiase par l'hydroxynaphthoate de bépénium." **Annales de la Société Belge de Médecine Tropicale**, 39 (5), 637–642. [English, German, Spanish & Flemish summaries pp. 639–640.]

Of 60 patients infected with *Necator americanus* and *Ancylostoma duodenale* and who returned for checking up to four weeks after treatment with one or two doses of 5 gm. bephenium hydroxynaphthoate (Alcopar) according to age, 80% had a 75% to 100% reduction in faecal egg counts, 10% a 25% to 75% reduction and 10% a 0% to 25% reduction. Apart from a mild diarrhoea in a few patients no side effects were observed.

W. M. Fitzsimmons

**2136**—GUERRERO, L., HOLGUIN, J. & BOTERO, D., 1960. [Department of Parasitology, University of Antioquia, School of Medicine, Medellin, Colombia.] "The use of dithiazanine as a mass treatment for intestinal helminthiasis." **American Journal of Tropical Medicine and Hygiene**, 9 (1), 37–38.

Single stool examination of 362 persons of various ages from Barrio Castilla, Medellin, showed 316 positive for intestinal helminths. Closer examination of 273 of these persons showed the commonest infections to be *Trichuris trichiura* (215 cases), *Ascaris lumbricoides* (207 cases), *Strongyloides stercoralis* (45 cases) and *Necator americanus* (41 cases); multiple infections were common. These individuals were treated with dithiazanine iodide at a daily dosage of 200 mg. for those under 15 kg. body-weight, 400 mg. for those between 16 kg. and 30 kg. and 600 mg. for those over 30 kg. given for eight consecutive days. Single stool examination four to six days after treatment showed complete eradication of 372 infections. In the remaining 136 infections the worm burden was considerably reduced. 43.5% of those treated complained of gastro-intestinal upsets. Guerrero *et al.* conclude that dithiazanine iodide is effective in the mass treatment of intestinal helminths in Colombia.

J. W. Smith

**2137**—HAHN, S. S., KANG, H. Y. & HAHN, Y. S., 1960. [Department of Internal Medicine, Seoul, Korea.] "The anthelmintic effect of bephenium hydroxynaphthoate on intestinal helminths." **Journal of Tropical Medicine and Hygiene**, 63 (8), 180–184.

Hahn *et al.* have investigated the anthelmintic effects of bephenium hydroxynaphthoate on 203 hospital patients infected with *Ancylostoma duodenale* (153 cases), *Trichuris trichiura* (109 cases), *Ascaris lumbricoides* (78 cases) and *Trichostrongylus orientalis* (75 cases); 171 patients had multiple infections. 2.5 gm. of the drug were given to each patient two hours before breakfast. Faecal egg counts were carried out before, and one to two weeks after, treatment. 98% of the *Ancylostoma duodenale*, 82.1% of the *Ascaris lumbricoides*, 77.3% of the *Trichostrongylus orientalis* and 41.3% of the *Trichuris trichiura* cases were completely cleared; those cases only incompletely cleared each showed a reduction in faecal egg counts. Of 144 patients specially observed 78 complained of mild and transient side effects; liver and renal functions were not affected by the drug. The relative effectiveness of bephenium hydroxynaphthoate and other anthelmintics in the control of nematode infections is discussed.

J. W. Smith

- 2138—HSIEH, H. C. ET AL., 1960. [Department of Parasitology, Kaohsiung Medical College, Taiwan.] "The treatment of hookworm, *Ascaris* and *Trichuris* infections with bephenium hydroxynaphthoate." *American Journal of Tropical Medicine and Hygiene*, 9 (5), 496-499.

Hsieh *et al.* treated 48 children aged between 10 and 15 years with bephenium hydroxynaphthoate; 44 were infected with *Ascaris lumbricoides*, 48 with *Trichuris trichiura* and 48 with hookworm (predominantly *Ancylostoma duodenale*). Two doses of 2.5 gm. of bephenium base given on one day reduced the mean egg counts of *Ancylostoma* infections in 19 children by 99% and cured 89%, reduced the mean egg counts of *Ascaris* infections in 20 children by 91% and cured 65% and reduced the mean egg counts of *Trichuris* infections in 23 children by only 59% and cured only 4%. The results obtained with doses ranging from 4.0 gm. to 17.5 gm. given over one to seven days are tabulated. The side effects caused by 5.0 gm. of bephenium base given on one day were mild and subsided when the drug was discontinued.  
J. W. Smith

- 2139—IYENGAR, M. O. T., ROOK, H. DE & DIJK, W. J. O. M. VAN, 1959. "Interruption of transmission of *Anopheles*-borne filariasis by indoor residual spraying in Netherlands New Guinea." *Tropical and Geographical Medicine*, Amsterdam, 11 (3), 287-290.

Mosquitoes of the *Anopheles punctulatus* group transmit both malaria and *Wuchereria bancrofti* in parts of Netherlands New Guinea. Indoor residual spraying with insecticides was reported to have had good results in the control of malaria in a large part of this area but no data were available on its effects on the transmission of filarial infections. Three villages were investigated to obtain this information; the mosquito vectors in them are *A. koliensis*, *A. farauti* and *A. punctulatus*. Of a population of about 300 in the three villages, 285 were examined and revealed microfilaria infection rates of 14.4%, 15.1% and 23.8% respectively; the gross elephantiasis rate was 1.4% (four), comprising three of the legs and one of the arm; all three males of this group had hydroceles. Microfilariae were found in none of the 98 children under ten years old who were examined; in the 10 to 19 age group six of 55 persons were positive; in the next three groups the incidence rose rapidly to a maximum of 51.4% in the 40 to 49 age group. Examination of mosquitoes *A. koliensis* (133) and *A. punctulatus* (52) showed 7.5% and 7.7% respectively infected with larval forms, in numbers ranging from one to 46. In none of the mosquitoes had the development of the larval forms proceeded beyond the "middle phase of the second instar". "As the residual spraying has been in operation only for the past four years, and as no precise data are available in regard to microfilaria rates for the earlier age groups in the villages for the pre-spraying period, it is not possible to determine whether the younger age groups have been protected from filarial infection. However the absence of microfilarial infections in 98 children below the age of 10 years . . . and the low incidence of infections (3.6%) in the age group ten to 19 years, when taken in conjunction with the absence of third instar larvae in the series of mosquito examinations from these villages, all seem to support the view that transmission of the infection has definitely been interrupted."  
J. J. C. Buckley

- 2140—JASKOSKI, B. J., 1961. [Department of Biological Sciences, Loyola University, Chicago, Illinois, U.S.A.] "An apparent swine *Ascaris* infection of man." *Journal of the American Veterinary Medical Association*, 138 (9), 504-505.

Pig ascaris eggs were accidentally swallowed by a student aged 20 years who later passed a living male ascarid. It is not thought to be likely that he had already been infected with human *Ascaris lumbricoides* and it is therefore probable that he became infected with the pig strain.  
W. H. Fitzsimmons

- 2141—JAYEWARDENE, G., ISMAIL, M. M. & WIJAYARATNAM, Y., 1960. [Medical Research Institute, Colombo, Ceylon.] "Bephenium hydroxynaphthoate in treatment of ascariasis." *British Medical Journal*, Year 1960, 2 (5194), 268-271.

A minimum dose of 1.25 gm. of bephenium hydroxynaphthoate was effective in reducing faecal egg counts in both light and heavy infections of *Ascaris* in children by at least 80% and also caused the passage of worms in the stool; Jayewardene *et al.* recommend this dosage as safe for any age group. The drug was best given in a 3.5% sugar solution flavoured with lemon essence. Vomiting was the only disagreeable side effect directly attributable to the drug



and was more severe in children under four years of age; in one case shock occurred after treatment which was probably caused by a fall in intra-abdominal pressure following the sudden evacuation of a large number of worms.

J. W. Smith

**2142**—JUNG, R. C. & McCROAN, J. E., 1960. [Department of Tropical Medicine and Public Health, Tulane University School of Medicine, New Orleans, Louisiana, U.S.A.] "Efficacy of bephenium and tetrachloroethylene in mass treatment of hookworm infection." *American Journal of Tropical Medicine and Hygiene*, **9** (5), 492-495.

214 of 1,807 schoolchildren were found infected with hookworm; worm burdens were generally low. 80 children were treated with 0.06 ml. of tetrachlorethylene per lb. body-weight, 31 were given bephenium hydroxynaphthoate as a single dose of 2.5 gm., 40 were given two doses on the same day of 2.5 gm. and 24 were given three doses on the same day of 2.5 gm. of bephenium base each dose; the remaining 39 children, who refused treatment, were observed for comparison. Percentage reductions in mean egg counts following treatment were approximately 99%, 89%, 84%, 64% and 50% (untreated) respectively; percentages of children completely cured were 81%, 29%, 30%, 16% and 26% (untreated) respectively. The drugs were given at home by the parents. Side effects, especially nausea and vomiting, occurred more frequently with bephenium than with tetrachlorethylene. Jung & McCroan conclude that bephenium possesses some anthelmintic activity but that tetrachlorethylene is superior.

J. W. Smith

**2143**—KAKEHASHI, Y., 1960. [Department of Parasitology, Kurume University School of Medicine, Kurume, Japan.] [The distribution of hookworm in Ogoori village and the anthelmintic effect of tetrachlorethylene.] *Journal of the Kurume Medical Association*, **23** (11), 4999-5002. [In Japanese: English summary p. 5002.]

**2144**—LAGRAULET, J. & TORROELLA, J., 1960. [Institut de Parasitologie, Faculté de Médecine de Paris, France.] "Étude des lésions oculaires onchocerquiennes observées au Mexique (États de Oaxaca et de Chiapas)." *Bulletin de la Société de Pathologie Exotique*, **53** (2), 322-332.

Lagraulet & Torroella, who have wide experience of the clinical aspects of onchocerciasis in West Africa, report the results of observations made in villages in two areas in Mexico where the infection is endemic. 30 infected people were examined at Belisario in Chiapas and 22 patients had ocular lesions. Chorio-retinitis was seen in five cases, corneal lesions (punctate and sclerosing keratitis) in 18 cases, iritis in six cases and lesions of the posterior segment in four cases, all of the last-mentioned being over the age of 45 and two being blind. Three remote villages in the State of Oaxaca were visited and a total of 143 people examined. Infections with *Onchocerca* were found in 137 people, of which 33 presented ocular lesions. Chorio-retinitis was seen in eight cases, corneal lesions in 20, iritis in 15 and lesions of the posterior segment in eight, one of whom was blind. Ocular complications in patients with onchocerciasis in Mexico are stated to be less serious than those in patients in Africa; this may be due to the limited movement of the vectors, which do not pass from one valley to another in mountainous regions, and to a campaign involving the regular excision of nodules from infected persons and occasional treatment with hetrazan.

P. Williams

**2145**—LAMBOTTE, C., BAYOKA, S., MULUNDA, L. E. & BOSILO, P., 1960. [Centre de Pédiatrie de la Croix Rouge, Léopoldville, Congo.] "L'hydroxynaphthoate de béphénium dans l'ankylostomose du nourrisson et de l'enfant." *Annales de la Société Belge de Médecine Tropicale*, **40** (5), 771-781. [English, German, Spanish & Flemish summaries pp. 778-780.]

The authors report on their experience in the use of bephenium hydroxynaphthoate in the treatment of ancylostome infection in children and infants in the Congo, some of which had heavy infections accompanied by severe anaemia. A high degree of complete disinfestation is recorded (80% to 90% of cases) with minimal side effects. The activity is considered to be better than that of tetrachlorethylene.

W. M. Fitzsimmons

**2146**—MARIA, B. DE & BEGGI, D., 1958. [Istituto di Medicina del Lavoro dell'Università di Siena, Italy.] "Aspetti profilattici e assicurativi dell'anchilostomiasi agricola." *Annali della Sanità Pubblica*, **19** (3), 613-622. [English, French, German & Spanish summaries pp. 620-621.] Maria & Beggi discuss some important points of prophylaxis and of the insurance aspects of

ancylostomiasis in agricultural workers, amongst whom the incidence is increasing. It is suggested that the incidence is being reduced amongst the industrial section of the Italian population. N. Jones

**2147**—MIYAZAKI, I., 1961. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [Human gnathostomiasis.] **Fukuoka Acta Medica**, **52** (5), 367–371. [In Japanese: English summary p. 371.]

An annotated series of photographs is presented illustrating the clinical pathology of *Gnathostoma spinigerum* in man, and the various stages in its life-history in cyclops and the fishes *Ophicephalus argus* and *O. tadianus*, recently introduced into Japan from Korea and from Formosa respectively. R. T. Leiper

**2148**—MONEY, G. L., 1960. [Department of Medicine, Makerere College Medical School, Kampala, Uganda.] “Hetrazan” eosinopenia in onchocerciasis. A preliminary communication.” **Journal of Tropical Medicine and Hygiene**, **63** (10), 238–241.

A decrease in the basal eosinophil count of African males from an area endemic for *Onchocerca volvulus* was induced by the oral dosage of 100 mg. of hetrazan; eosinopenia was greater in those with positive skin snips (a mean decrease of 43%) than in those negative for microfilariae (a mean decrease of 24%). 1.0 gm. of suramin given intravenously to patients with onchocerciasis induced little change in the basal eosinophil count. 40 mg. of ACTH given intramuscularly to patients with onchocerciasis induced a degree of eosinopenia similar to that induced by hetrazan. Hetrazan may cause the release of histamine-like substances from the worms, which, acting through the pituitary-adrenal axis, could cause eosinopenia; the partial blocking of this effect, seen when 100 mg. of mepyramine maleate was given at the same time as hetrazan, is consistent with this view. The practical implications of the eosinopenic effect of hetrazan are discussed. J. W. Smith

**2149**—MOST, H., 1958. “Anthelmintic therapy. II. Hookworm infections.” **New England Journal of Medicine**, **259** (9), 441–443.

**2150**—NAKASHIMA, T., 1960. [Department of Parasitology, Faculty of Medicine, Kagoshima University, Kagoshima, Japan.] [Studies on ancylostomiasis in Southern Kyushu. Sociological studies on ancylostomiasis in medical practice at a village in Southern Miyazaki Prefecture.] **Medical Journal of Kagoshima University**, **12** (1), 184–194. [In Japanese: English summary p. 184.]

**2151**—NUDOLSKAYA, O. E., 1960. [Institut akusherstva ginekologii, Ministerstvo zdravookhraneniya RSFSR, U.S.S.R.] [Craw-craw (onchocerciasis) of the vulva and its treatment by biogenic stimulants.] **Sovetskaya Meditsina**, **24** (12), 86–93. [In Russian: English summary p. 93.]

Nudolskaya discusses the course of onchocerciasis of the vulva in 120 patients and the various methods of treatment in use. She recommends daily subcutaneous or intramuscular injections (1 ml.) of aloes extract for 30 days, the course being repeated every three months, and simultaneous, twice-daily application to the vulva of an aloes ointment (prepared from aloes juice, castor oil, emulsifier and eucalyptus oil). Such treatment cured pruritus in 73 of 80 women and in 40 of these the vulval tissues returned to normal. G. I. Pozniak

**2152**—PAVIOT, J. J. & NIOGUY, C., 1960. [Medical College, Pondicherry, India.] “Essais d’un nouvel anthelminthique: sel de bphenium.” **Bulletin de la Société de Pathologie Exotique**, **53** (5), 806–809.

Paviot & Nioguy compare the value of bphenium hydroxynaphthoate with that of tetrachlorethylene in the treatment of human ancylostomiasis; they conclude that the latter is more efficient but less convenient since patients must be kept in hospital during treatment whereas when bphenium is used they can remain ambulatory. 2 gm. to 3 gm. of bphenium given as a single dose provokes diarrhoea; this can be avoided by spreading it over three days.

W. M. Fitzsimmons



**2153**—PEARSON, E., BORGONÑO, J. M. & SALCEDO, M., 1960. "Síndrome meníngeo en triquinosis." *Boletín Chileno de Parasitología*, **15** (4), 70–72. [English summary p. 70.]  
The differential diagnosis of meningitis caused by *Trichinella spiralis* is discussed and details are given of three clinical cases.  
W. M. Fitzsimmons

**2154**—PIĄTKOWSKA, W., 1961. [Wojewódzka Stacja Sanitarno-Epidemiologiczna, Gdańsk, Poland.] "Wyniki badań na obecność jaj owsików w wycierach kołodobytniczych oraz w kurzu w trzech zospołach dziecięcych." [Investigations at three children's centres for pinworm ova in perianal smears and in dust.] *Wiadomości Parazytologiczne*, **7** (2), 129–134. [English summary p. 134.]

**2155**—PRICE, D. L., 1961. [Walter Reed Army Medical Center, Washington, D.C., U.S.A.] "The occurrence of *Loa loa* in Uganda." [Correspondence.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (2), 199.  
Two instances of *Loa loa* infection from the Lengo and Mengo Districts were observed at autopsies and seven cases were observed on safari in the Toro District. Hitherto this infection has not been considered endemic in Uganda.  
R. T. Leiper

**2156**—ROOK, H. DE, 1959. "Filariasis in the village of Inanwatan (south coast of the Vogelkop, Netherlands New Guinea)." *Tropical and Geographical Medicine. Amsterdam*, **11** (4), 313–331.  
The whole population (1,125) of Inanwatan was examined for microfilariae of *Wuchereria bancrofti* and for clinical signs of bancroftian filariasis. Of these, 235 or 20·9% were positive for microfilariae, 90 or 8% had filarial disease and 291 or 25·9% had microfilariae or filarial disease or both. The microfilarial density averaged 22·4 per 15 cu. mm. per person. The 90 persons showing signs of disease were classified as follows: elephantiasis of one leg—32, of both legs—23, of one leg combined with elephantiasis of scrotum and penis—one, of both legs combined with elephantiasis of scrotum—one, of both legs combined with hydrocele—two, hydrocele—23, chronic epididymitis—four, fibrosis of testis—four. Of the 39 cases of elephantiasis, 36% had microfilaraemia which is high and contrary to the general rule. Microfilaraemia in males (23·7%) was higher than in females (18·1%) but it was the reverse in the case of microfilarial density. There was a progressive increase in the microfilarial incidence according to age; up to five years it was 4·1% and over 50 years it was 42·2%. Disease rate and endemicity (=combined data on microfilaria rate and disease) showed similar rising curves. The mosquito vectors are *Culex annulirostris*, *C. fatigans* and *Anopheles farauti*. Of these *C. annulirostris* is the most important. Control of the disease by taking measures against the larvae would be too costly or impossible; spraying with residual insecticides would probably be effective against *A. farauti*; mass administration of diethylcarbamazine should be effective in isolated villages such as Inanwatan.  
J. J. C. Buckley

**2157**—SAGNET, H. & DEMÉ, J., 1960. "Essai de traitement de l'ankylostomose par l'hydroxynaphtoate de béphénium. Rapport préliminaire à propos de 70 observations à Brazzaville." *Médecine Tropicale*, **20** (3), 362–364.  
In Brazzaville 3,806 individuals with intestinal parasites were treated during a year. 40% had hookworm and 43% had ascaris. Over 500 cases were treated with bephenium hydroxynaphtoate without a single accident and with good results. 71% of the ascaris cases were completely cured. 5 gm. of Alcopar were given to adults and to children over two years old and 2·5 gm. to children under two years of age, daily for ten days, until a cure was complete.  
R. T. Leiper

**2158**—SCHACHER, J. F. & DANARAJ, T. J., 1960. [Department of Parasitology, University of Malaya, Singapore.] "Intestinal helminths in relation to eosinophilic lung (tropical eosinophilia) in Singapore." *American Journal of Tropical Medicine and Hygiene*, **9** (6), 616–619.  
The stools of 569 male patients in the General Hospital, Singapore were examined for helminth eggs to see if there is an association between positive stools and the presence of (i) eosinophilic lung, (ii) mild eosinophilia, and (iii) no eosinophilia. The helminths concerned in this study were *Ascaris lumbricoides*, *Trichuris trichiura*, hookworm and *Strongyloides stercoralis*, and the patients were subdivided into three ethnic groups, Indians, Chinese and Malays. The differences in the percentages of people infected with each kind of helminth

were found to be not significant in the three eosinophilia categories. Indians were found to have a higher proportion of cases of eosinophilic lung than the other two ethnic groups (as has previously been reported from Singapore) but this cannot be explained on the basis of differences in the prevalence of the intestinal helminths.

J. J. C. Buckley

**2159**—SENEVIRATNA, P., 1960. [Department of Veterinary Science, University of Ceylon, Peradeniya, Ceylon.] "Visceral larva migrans." *Ceylon Veterinary Journal*, 8 (3/4), 88–92.

Seneviratna reviews the published work on the nature and treatment of visceral larva migrans. The condition can manifest itself in three ways: (i) an eosinophilia-hepatomegaly syndrome occurring chiefly in children, (ii) a tropical eosinophilia with pulmonary symptoms and (iii) a nervous syndrome sometimes with lesions occurring in the eye. The part played by nematode larvae in these diseases may best be studied by labelling the larvae with radio-active isotopes. 48 references are given.

J. W. Smith

**2160**—SUSANNA, L., 1958. [Istituto di Igiene dell'Università di Bologna, Italy.] "L'anchilostomiasi nella provincia di Ascoli Piceno e piano di bonifica." *Annali della Sanità Pubblica, Rome*, 19 (6), 1149–1160. [English, French, German & Spanish summaries pp. 1158–1160.]

Faecal examination of 965 persons, constituting almost the entire population of an area of 247 hectares in the province of Ascoli Piceno, revealed *Ancylostoma* infection in 166 females and 133 males. The incidence was highest among the 16 to 20-year-old age group. Babies of one to three years were free from infection. Inquiries conducted in homes during the same period (1956–57) showed that the incidence of infection was related to the particular agricultural and hygienic conditions.

N. Jones

**2161**—TRAWINSKI, A., 1957. "Qualche aggiornamento sulla trichinosi." *Zooprofilassi*, 12 (12), 928–934.

This paper is a review of the occurrence, life-cycle, pathogenicity, diagnosis and prevention of trichinellosis. In addition to eating infected carcasses, pigs may infect themselves by eating faeces containing newly excysted larvae from freshly infected pigs and man. Heating all parts of a carcass to 85°C. or freezing all parts at –30°C. for three days kills encysted larvae.

W. M. Fitzsimmons

**2162**—TURNER, L. H. & SODHY, L. S., 1959. [Institute for Medical Research, Kuala Lumpur, Federation of Malaya.] "Studies on filariasis in Malaya: a trial mass treatment of *Wuchereria malayi* filariasis with single daily doses of diethylcarbamazine." *Annals of Tropical Medicine and Parasitology*, 53 (3), 268–273.

Turner & Sodhy describe the difficulties they experienced in attempting the mass treatment of *Wuchereria malayi* with single daily doses of diethylcarbamazine in a community of 156 persons on Penang Island, Malaya. Many persons missed taking doses of the drug for a variety of reasons and the incidence of febrile reactions was high. Later work by Edeson & Wharton has shown that single doses of diethylcarbamazine given at weekly or monthly intervals for a limited period give good results [for abstract see *Helm. Abs.*, 27, No. 9f].

J. W. Smith

**2163**—UCHIZONO, Y., 1961. [First Department of Internal Medicine, Faculty of Medicine, Kagoshima University, Kagoshima, Japan.] [Pathophysiological studies on filariasis. Studies by means of lung and kidney biopsies.] *Fukuoka Acta Medica*, 52 (1), 89–110. [In Japanese: English summary pp. 89–90.]

Pulmonary blood from 14 cases was examined for microfilariae of *Wuchereria bancrofti*; these were found in ten. Microfilariae were found in four of seven cases examined during the day when the peripheral blood was negative. The number of larvae found in lung tissue by biopsy coincided with that of larvae found in the peripheral blood on the previous night. Microfilariae were found in only one case in kidney biopsies and the peripheral blood was positive at the same time. In four cases with dyspnoea the larvae appeared in the peripheral blood both during the day and at night. The nocturnal periodicity appeared again after thoracentesis. Uchizono interpreted such disturbance of the periodicity as the result of the mechanical compression or the collapse of the lungs.

Y. Yamao



**2164**—WILSON, T., 1961. [Liverpool School of Tropical Medicine, Liverpool, England.] "Filariasis in Malaya—a general review." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (2), 107–129. [Discussion pp. 130–134.]

In the Federation of Malaya *Wuchereria bancrofti* occurs only in small endemic foci, usually being found in immigrants from India and China. The predominant human filarial infection is *Brugia malayi*, two forms of which are recognized and are associated with different types of terrain and with different mosquito faunas: (i) the periodic form occurring typically in coastal rice fields and open swamps in north-west Malaya; and (ii) the semi-periodic form, typically present in the lower reaches of the Pahang and Perak rivers on the narrow fringe of cultivated land, backed by fresh-water swamp forest where *Mansonia "dives"* breeds extensively and has an average infective larva rate of 0·6%. The most important natural vector of *B. pahangi* is *M. annulata* but *Armigeres obturbans* proved an excellent host in artificial feeding experiments. The various primates, carnivores, edentates, insectivores and rodents found with natural *Brugia* infections in East Pahang are tabulated. The results of various control measures aimed at eliminating the parasite reservoir by mass treatment of the local population or by vector control are discussed.

R. T. Leiper

**2165**—WONG HOCK BOON & TAN KWANG HOH, 1961. "Severe whipworm infestation in children." *Singapore Medical Journal*, **2** (1), 34–37.

Twenty pure cases of severe whipworm infection with symptoms of chronic dysentery, anaemia, malnutrition and rectal prolapse were successfully treated with dithiazanine iodide without any side effects. Three divided doses were given daily for five days, the total daily dose being 100 mg. for body-weight 10–20 lb., 200 mg. for weight 20–30 lb. and 300 mg. for weight 30–40 lb.

R. T. Leiper

**2166**—YOUNG, M. D. ET AL., 1960. [Department of Health, Education & Welfare, PHS, National Institute of Allergy & Infectious Diseases, Laboratory of Parasite Chemotherapy, P.O. Box 717, Columbia, South Carolina, U.S.A.] "The comparative efficacy of bephenium hydroxynaphthoate and tetrachloroethylene against hookworm and other parasites of man." *American Journal of Tropical Medicine and Hygiene*, **9** (5), 488–491.

The efficacy of bephenium hydroxynaphthoate was tested against hookworm in 163 mental patients with initial egg counts ranging from 50 to over 2,000 eggs per gm. of faeces; most of the patients were also infected with *Trichuris trichiura* and 13 had *Ascaris lumbricoides*. 41 other patients with the same infections were treated with tetrachloroethylene as a comparison. Bephenium hydroxynaphthoate given as a daily dose of 5·0 gm. of the base on three or more consecutive days reduced the mean egg count of hookworm infections by about 95% and cured about 55%; 5·0 gm. bephenium base given for one or two days brought about a reduction in mean egg counts but the number of infections cured was low. Bephenium was only moderately effective against *T. trichiura* but was highly effective against *A. lumbricoides*. Apart from its superior anthelmintic action bephenium appears to be better than tetrachloroethylene in that no fasting, purging or other changes of habit are required of the patient.

J. W. Smith

### Miscellaneous

**2167**—ANTONOVA, M. V., 1958. [Kharkovski meditsinski institut, U.S.S.R.] [Treatment of sewage for helminth eggs at the State farm irrigation fields by the use of a sedimentation tank.] *Gigiena i Sanitariya. Moscow*, **23** (6), 79–80. [In Russian.]

**2168**—APPASOV, R. N., 1960. [Intestinal parasites of man and pigs in the Alma-Ata region.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, **12**, 86–90. [In Russian.]

Helminth infections were found in 8·1% of 467 persons examined at a pig farm in the Alma-Ata region. [No helminth infections of the pigs are mentioned.] The total incidence of helminthiasis was highest among schoolchildren. Two cases of *Diphyllbothrium latum* had come from Siberia.

N. Jones

\***2169**—BIAGI, F., NAVARRETE, F. & ROBLEDO, E., 1957. "Observaciones sobre diagnóstico y frecuencia de la amibiasis y otras parasitosis en niños con diarrea, de la Ciudad de México." *Boletín Medico del Hospital Infantil. Mexico*, **14** (6), 617–626.

- 2170—GORYAINOVA, Z. P., STARODUBOVA, T. F. & LAKIZA, P. I., 1958. [Dnepropetrovski meditsinski institut, U.S.S.R.] [Role of various environmental factors in the spread of helminthiasis in children's institutions.] *Gigiena i Sanitariya. Moscow*, 23 (5), 72-75. [In Russian.]
- 2171—JANSEN, F., AMARATUNGE, B. & WILSON, J. R., 1960. "A study of pulmonary eosinophilia. With special reference to its treatment." *Ceylon Medical Journal*, 5 (4), 167-170. Pulmonary eosinophilia, a common disease in Ceylon, clinically resembles bronchial asthma. From a study of over 400 patients hetrazan proved to be as good as and safer than the organic arsenicals, but the aetiology of the condition remains unsolved. R. T. Leiper
- 2172—LEPAK, J. W., 1961. [University of Utah, U.S.A.] "Incidence and transmission of animal parasites in sewage and culinary water." *Dissertation Abstracts*, 21 (9), 2835.
- 2173—NAGATY, H. F. & KHALIL, H. M., 1960. [Department of Parasitology, Faculty of Medicine, Ein-Shams University, Cairo, Egypt.] "Incidence of parasitic infections among the outpatients attending the Rural Health Unit at Ezbet-El-Burg, Damietta Province, Egypt, U.A.R." *Journal of the Egyptian Medical Association*, 43 (5), 298-311.
- 2174—RICCI, M., 1961. [Istituto Superiore di Sanità, Laboratori di Parassitologia, Rome, Italy.] "Il parassitismo intestinale nella popolazione infantile di un' 'area depressa'." *Rivista di Parassitologia*, 22 (1), 1-26. [English summary p. 26.] Over 800 children aged 6 to 12 years in the province of Salerno were examined by the Scotch tape method during 1958-60; the faeces of 734 of them were also examined. The incidence of *Enterobius vermicularis*, *Ascaris lumbricoides* and *Trichuris trichiura* varied with the age, but not with the sex. *Hymenolepis nana* was also frequently present but *H. diminuta* and *Taenia saginata* were recorded only once. The number of species per individual ranged from one to four. N. Jones
- 2175—SZAC, A., 1961. [Miejska Stacja Sanitarno-Epidemiologiczna, Gdańsk, Poland.] "Występowanie robaków jelitowych u młodzieży szkół podstawowych Gdańska." [Incidence of intestinal worms in schoolchildren in Gdańsk.] *Wiadomości Parazytologiczne*, 7 (2), 135-138. [English summary p. 138.]
- 2176—VINKE, B. & VAN DER SAR, A., 1959. "Dithiazanine, a new anthelmintic." *Tropical and Geographical Medicine. Amsterdam*, 11 (4), 335-338. On Curaçao 166 helminth-infected persons were treated with dithiazanine, the usual dosage for adults being 200 mg. three times daily for five days. 16 adults were given half this dose for 10 days and eight patients 12 to 16 years old were given it for five days. Faeces examination showed a day to day decrease in the numbers of helminth eggs and if none were found after six days the death of the helminth was assumed. Of 133 patients with *Trichuris* 115 were cured; of eight with *Hymenolepis nana* all were cured; of 23 with *Strongyloides* all were cured but one relapsed after three months; of six with *Ascaris* all reacted favourably; of 20 with *Ancylostoma duodenale* ten were still positive, this infection being more resistant to treatment than the others. "The only side effects were vomiting (33%) and diarrhoea (3.6%); they subsided rapidly after termination of treatment. Vomiting was not caused by premature disintegration of the enteric-coated tablets in the stomach; no correlation was found between the degree of acidity of the gastric contents and the side effects. Promazine hydrochloride may be useful in suppressing the vomiting." J. J. C. Buckley

## VETERINARY HELMINTHOLOGY

### Horses, Donkeys and Mules

- 2177—LELAND, Jr., S. E., DRUDGE, J. H., WYANT, Z. N. & ELAM, G. W., 1961. [Department of Animal Pathology, University of Kentucky, Lexington, Kentucky, U.S.A.] "Studies on *Trichostrongylus axei* (Cobbold, 1879). VII. Some quantitative and pathologic aspects of natural and experimental infections in the horse." *American Journal of Veterinary Research*, 22 (86), 128-138. The authors describe the pathological inflammatory changes produced in the stomachs of



susceptible horses by artificial infection with *Trichostrongylus axei* and note an average prepatent period of 25.3 days and average male to female ratio of 0.72 for this species.

W. M. Fitzsimmons

- 2178—LOPUCHOVSKÝ, J. ET AL., 1958. [Katedra internej medicíny I, Veterinárská fakulta VŠP, Košice, Czechoslovakia.] "Skúsenosti s niektorými antihelminťikami u koní." **Folia Veterinaria, Kosice**, 2 (1/2), 169–182. [English, German & Russian summaries pp. 181–182.]

Piperazine adipate was either intubated or given with food at doses of 0.1 gm. to 0.4 gm. per kg. body-weight to 91 horses, one to six years old, harbouring intestinal helminths. 64 other horses were treated with Antascarin-Galena, which contains Fowler's solution, *Chenopodium* and *Tanacetum* extracts and aloes. Antascarin was given, after 12 hours' fasting, three times daily at doses of five to eight coffee spoons to animals weighing 200 kg. to 400 kg. This drug had about 73% efficacy against *Parascaris equorum* whereas piperazine adipate was almost 100% efficient. Piperazine adipate also caused a more efficient elimination of strongyles. Its effect was verified either by a repeated application or by administration of Antascarin; the efficiency of Antascarin was confirmed by using piperazine adipate. N. Jones

- 2179—POYNTER, D., 1960. [Veterinary Research Department, Allen & Hanbury's Ltd., Ware, Herts, England.] "The arterial lesions produced by *Strongylus vulgaris* and their relationship to the migratory route of the parasite in its host." **Research in Veterinary Science, London**, 1 (3), 205–217.

Poynter studies the evidence available from the literature and from his personal observations on 43 horses and, from the distribution of arterial lesions, concludes that *Strongylus vulgaris* leaves the left heart in the oxygenated blood and migrates to the alimentary tract by way of the intestinal vessels. Information on the nature and development of arterial lesions is well illustrated by diagrams and photomicrographs. W. M. Fitzsimmons

- 2180—RAI, P. & AHLUWALIA, S. S., 1958. [Parasitology Department, U. P. College of Veterinary Science & Animal Husbandry, Mathura, U.P., India.] "A note on *Probstmayria vivipara* (Probstmayr, 1865) Ransom, 1907 from an Indian pony with brief remarks on its systematic position." **Proceedings of the National Academy of Sciences, India. Section B**, 28 (6), 395–398.

*Probstmayria vivipara* is recorded for the first time from the horse in India. The species is redescribed and the literature on its classification is reviewed. W. M. Fitzsimmons

- 2181—TODD, A. C., 1961. [Department of Veterinary Science, University of Wisconsin, U.S.A.] "Internal parasites of the horse and their control." **Illinois Veterinarian**, 4 (2), 37–39.

## Cattle

- 2182—ANON., 1961. "Liver flukes in cattle." **Leaflet. United States Department of Agriculture**, No. 493, 8 pp.

- 2183—ALICATA, J. E., 1959. [University of Hawaii, Honolulu, Hawaii.] "Value of piperazine dihydrochloride in the treatment of cooperiasis in calves." [Abstract.] **Journal of Parasitology**, 45 (4, Sect. 2), 48.

- 2184—ANDERSEN, F. L. ET AL., 1960. "Changes in blood of calves experimentally infected with *Ostertagia ostertagi* or *Haemonchus placei*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 38–39.

In experiments with calves aged 70 to 110 days it was shown that infection with 12,500 to 165,000 *Haemonchus placei* (antelope strain) produced no marked reduction in weight gain, symptoms of parasitism or changes in serum proteins although the haematocrit, haemoglobin and erythrocyte levels decreased. When inoculated with 25,000, 50,000 or 300,000 larvae of *Ostertagia ostertagi*, clinical symptoms, a significant reduction in weight gain and decrease in albumin with increase in one or more globulins ensued. With either species there was an increase in leucocytes during the first few weeks of infection. The experiments were carried out for periods of two to three months. S. Willmott

- 2185—BONDAREVA, V. I., 1960. [Nauchno-issledovatelski institut veterinarii, Kazakhskaya Akademiya selskokhozyaistvennikh nauk, U.S.S.R.] [Specific validity of *Moniezia alba*—a cestode of cattle.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, 12, 140–144. [In Russian.]

In the intestinal cestode material collected 15 to 20 years ago from cattle in Kazakhstan, the proportion was *Moniezia benedeni* in 28.3%, *M. alba* in 16.3% and *M. expansa* in 7% of infected animals. *M. alba* was not found in mixed infections and did not occur in sheep. Bondareva considers *M. alba* to be an independent species characterized by the complete absence of interproglottidal glands, a large almost square scolex which is well defined from the neck, a compact white body and well developed crenated lateral edge to the proglottides.

G. I. Pozniak

- 2186—CASAROSA, L., 1957. "Contributo alla conoscenza della rottura della cisti di echinococco in fegato di bovino." *Zooprofilassi*, 12 (9), 601–616. [English & French summaries p. 616.]

Rupture of hydatid cysts in the liver of cattle is not uncommon. It may occur into the large blood vessels (inferior vena cava and hepatic vein), into the liver parenchyma, or into the bile-ducts and the gall-bladder. Cases are described and illustrated by photographs and photomicrographs.

W. M. Fitzsimmons

- 2187—DASS, N., PANDA, S. N. & BISWAL, G., 1961. [Department of Animal Husbandry and Veterinary Services, Cuttack, Orissa, India.] "Treatment of ascariasis in young calves with piperazine citrate." *Indian Veterinary Journal*, 38 (4), 194–197.

Ascariasis was treated in 29 buffalo and nine cow calves with 100 mg. per lb. body-weight of Antepar Elixir (piperazine citrate), followed by magnesium sulphate. On the eighth day all the treated calves were negative and no side effects were observed.

N. Jones

- 2188—DEWHIRST, L. W., TRAUTMAN, R. J., PISTOR, W. J. & REED, R. E., 1960. "Studies on ante-mortem diagnostic procedures in bovine cysticercosis infections." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 10–11.

The authors describe haematological and immunological (precipitin and skin tests) studies on cattle experimentally infected with *Cysticercus bovis*. Skin tests were also performed on 499 cattle suspected of being infected; of these 69 were considered positive and 430 negative. On post-mortem examination none of the 430 were found to be infected; four of the 69 positive to the skin test harboured viable cysts and the rest calcified cysts.

S. Willmott

- 2189—DIRKSEN, G. & RADERMACHER, F., 1960. [Richard-Götze-Institut, Tierärztlichen Hochschule, Hannover, Germany.] "Erste Ergebnisse der Allgemeinbehandlung der Stephanofilariose ('Sommerwunden') des Rindes mit Antimosan und Neguvon." *Deutsche Tierärztliche Wochenschrift*, 67 (3), 70–72. [English summary pp. 71–72.]

The authors describe the treatment of Friesian cows for summer dermatitis caused by *Stephanofilaria* sp. in north-west Germany. Antimosan given subcutaneously at the rate of 0.63 gm. per 50 kg. body-weight three times at weekly intervals produced complete cure or marked improvement in most cases, with a few failures, and Neguvon given orally at the rate of 60 mg. per kg. cured or improved most cases after one or two treatments. Neguvon was well tolerated but Antimosan occasionally produced side effects such as diminution of milk yield, muscular tremors and inappetence.

W. M. Fitzsimmons

- 2190—FROYD, G., 1960. [Veterinary Research Laboratory, Kabete, Kenya.] "The incidence of liver flukes (*Fasciola gigantica*) and hydatid cysts (*Echinococcus granulosus*) in Kenya cattle." *Journal of Parasitology*, 46 (5), 659–662.

In an earlier paper Froyd (1959) cited observations (by Rogoff) that the livers of those cattle infected with *Fasciola gigantica* contained remarkably few hydatid cysts. A further investigation on 1,000 cattle has now shown that the presence of either parasite in the liver lowers the incidence of the other in this organ but the incidence of hydatid in the lung is only reduced insignificantly when there are flukes in the liver.

N. Jones



- 2191**—FROYD, G. & ROUND, M. C., 1960. [Veterinary Research Laboratory, Kabete, Kenya.] "The artificial infection of adult cattle with *Cysticercus bovis*." **Research in Veterinary Science**, London, 1 (3), 275–282.

Froyd & Round successfully infected young calves with *Cysticercus bovis* by the oral route using eggs of *Taenia saginata* but were unable to do so in older cattle. Using artificially hatched oncospheres of *T. saginata* they successfully established artificial infection, by the subcutaneous and intramuscular routes but not by the intravenous or epidural routes, in older cattle even although some of these had previously acquired natural infections. They suggest that this latter successful infection is due to the fact that the intestinal phase of immunity was by-passed and that, in cysticerciasis bovis, the intestinal phase of immunity is a more important barrier than the humoral phase.

W. M. Fitzsimmons

- 2192**—KESAVAN, M., 1961. "Chronic diarrhoea in hill cattle." **Indian Veterinary Journal**, 38 (3), 148–150.

Kesavan recommends anthelmintic treatment of cattle before and immediately after the monsoon season in order to control severe diarrhoea seen in the Anamalai Hills of Madras State.

W. M. Fitzsimmons

- 2193**—MALAKI, A., 1961. [Mysore Veterinary College, Hebbal, Bangalore-6, India.] "Prevalence of lungworms—*Dictyocaulus viviparus* among cattle in Hesseraghatta Farm, Bangalore." **Indian Veterinary Journal**, 38 (4), 201–203.

At post-mortem examination of a few young and old emaciated cattle which had died on the Government Livestock Farm at Hassaraghatta, north of Bangalore, the lungs showed various degrees of consolidation and collapse and bronchial abscesses containing masses of *Dictyocaulus viviparus*—a parasite still believed to be confined to hilly tracts of Northern India.

N. Jones

- 2194**—REINECKE, R. K., 1960. [Department of Parasitology, Faculty of Veterinary Science, Onderstepoort, South Africa.] "The rôle of infested dung in the transmission of nematode parasites in cattle." **Journal of the South African Veterinary Medical Association**, 31 (1), 45–52.

The natural process of development of the free-living stages of cattle nematodes in the dung pad are discussed. The dung pad acts as an incubator, the pre-infective stages growing and feeding on the faeces; the infective stage retains the moult of the second stage and neither feeds nor grows. Climatic factors such as available oxygen, temperature, evaporation and rainfall influence the free-living stages. Since dung dries on the surface forming a hard crust it acts as a shelter for the larval stages, a reservoir of infection and a prison from which the larvae can only escape when moisture is adequate. This mass can be broken up by the burrowing habits of dung beetles which not only aerate the dung causing more rapid hatching, but speed up the process of evaporation causing death of larval stages by desiccation. When man superimposes husbandry methods on his livestock two factors play an important role: (i) aggregation of eggs and larvae—cattle forced into kraals (cattle pens) defaecate in a confined space and vast quantities of manure accumulate; these act as a reservoir of infection which is harmless in the dry months but very dangerous when well distributed rains fall; (ii) concentration of susceptible animals—calves confined to pens adjacent to or within the kraal and grazing in a small calf paddock overnight become very heavily infected, whereas calves grazing in the paddock and not entering the kraal are not nearly as heavily infected. The provision of hygienic kraals and calf pens, the regular rotation of grazing paddocks in the wet season and the separation of age groups and regulation of breeding seasons, which were standard practice at Armoedsvlakte where the trials were carried out, were responsible for the calves being almost completely free from parasites.

R. K. Reinecke

- 2195**—REINECKE, R., 1960. [Section of Helminthology, Onderstepoort Laboratory, South Africa.] "A field study of some nematode parasites of bovines in a semi-arid area, with special reference to their biology and possible methods of prophylaxis." **Onderstepoort Journal of Veterinary Research**, 28 (3), 365–464.

In the North-western Cape, a semi-arid area with 10 to 20 inches of rain annually, serious periodic outbreaks of helminthiasis occurred in cattle. The species of nematodes identified were *Cooperia pectinata*, *C. punctata*, *Haemonchus placei*, *Oesophagostomum radiatum* and

*Bunostomum phlebotomum*. Field trials were carried out on the ecology and epizootiology of these parasites at Armoedsvlakte Research Station, Vryburg. The free-living stages were studied in the dung pad. From spring to autumn high temperatures, excessive evaporation of moisture from dung pads and destruction of the pad by dung beetles caused the death of large numbers of eggs and pre-infective larvae. If rain fell once, but preferably twice from the second to fifth day that dung pads were placed in the veld, considerably larger numbers of larvae reached the infective stage. In winter low temperatures prevented development to the infective stage. Infective larvae only migrated under conditions of adequate rainfall; survival of infective larvae both in the dung and after migration, varied with the species but was generally not longer than 24 days, except in the autumn and winter when some larvae survived for 105 days. The poor methods of animal husbandry were largely responsible for the spread of these parasites to susceptible stock. The rearing of calves in unhygienic pens, grazing in a paddock with older infested stock and suckling on cows in cattle pens with thick manure floors cause heavy infections in the summer and autumn during the rainy season. In the dry winter and spring calves did not acquire infection. Control measures included the provision of clean concrete floors in cattle yards and calf pens, the separation of age groups, regulated breeding and calving seasons, grazing rotation in calf and weaner camps, and strategic drenching with efficient anthelmintics.

R. Reinecke

- 2196—SCHANZEL, H., 1960. [Katedra pro parazitologii a invazní choroby VF VŠZ, Brno, Czechoslovakia.] "Nejzávažnější parazitózy mladého skotu." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, 33 (7/8), 555–562. [German & Russian summaries pp. 561–562.]

Schanzel enumerates the helminths found by autopsy and faecal and clinical examination of young cattle in Czechoslovakia, including those already recorded by others. The finding of *Mecistocirrus digitatus* by Baytaj (1958) in three cows in eastern Slovakia is stated to be the first record of this parasite in Europe.

N. Jones

- 2197—STAMPA, S., 1960. [Agro-Chem (Pty.) Ltd., P.O. Box 1366, Johannesburg, South Africa.] "The control of internal parasites of cattle with a 10:1 mixture of Neguvon and Asuntol." **Journal of the South African Veterinary Medical Association**, 31 (2), 243–249.

A mixture of Neguvon and Asuntol was tested against nematodes in cattle. A 9.1% solution of Neguvon plus 0.91% suspension of Asuntol was used in most cases. Two pre- and two post-treatment egg counts were made by the Gordon & Whitlock method. Species differentiation was calculated on a percentage basis from larval identification. The 10 : 1 mixture was effective against *Haemonchus*, *Trichostrongylus*, *Cooperia* and *Oesophagostomum* at 40 mg. per kg. body-weight, and at 60 mg. per kg. *Bunostomum* was controlled (i.e. 60% to 100% effective). Premedication with 10% sodium bicarbonate solution did not affect the efficacy of the mixture. Only on dry grass pastures were toxic effects noted when animals were dosed at the rate of 90 mg. per kg.

R. K. Reinecke

### Sheep and Goats

- 2198—ANON., 1961. "The common liver fluke in sheep." **Leaflet. United States Department of Agriculture**, No. 492, 8 pp.

- 2199—BELL, A. T. & YOUNG, R. B., 1961. "Treating sheep for lungworm." **Queensland Agricultural Journal**, 87 (1), 25–27.

- 2200—BESCH, E. D., MORRISON, R. D. & WEEKS, D. L., 1960. [Department of Veterinary Parasitology, Oklahoma State University, Stillwater, Oklahoma, U.S.A.] "A preliminary report on the variation in numbers of nematode eggs demonstrated in individual fecal pellets of sheep." **American Journal of Veterinary Research**, 21 (84), 917–918.

Nematode egg counts were made from faecal pellets of a ewe taken at random from samples collected over 24 hours. A modification of Stoll's technique employing decinormal sodium hydroxide solution (the ratio of faeces to solution 1 : 30) was used. Examination of 88 faecal



pellets showed a variation due to technique of 5.8% to 19.6%. The total numbers of eggs per pellet varied by 2.4% to 17.8% (assuming no variation in the technique) with three negative estimates. The weight and moisture contents of the pellets increased when the ration of prairie hay was supplemented with grain.

N. Jones

- 2201**—BHATIA, B. B. & PANDE, B. P., 1960. [U.P. College of Veterinary Science and Animal Husbandry, Mathura, India.] "Studies on lungworms (*Metastrongylidae* Leiper, 1908) parasitising Indian livestock. II. Observations on natural infestations with species of *Dictyocaulus* Railliet and Henry, 1907 and *Varestrongylus* Bhalerao, 1932 in the sheep of hills in Uttar Pradesh." **Proceedings of the National Academy of Sciences, India. Section B**, 30 (3), 217–233.

Bhatia & Pande examined the lungs of 62 hill sheep (*Ovis hodgsoni* and *O. nabhura*) from a slaughterhouse at Nainital. The worms recovered were identified as *Varestrongylus pneumonicus* and *Dictyocaulus filaria*, the authors deciding from examination of specimens that *D. unequalis* is a synonym of the latter. The account includes some discussion of the morphology of the adult worms and their distribution as well as a description of the histological changes in infected lungs. Descriptions of the first-stage larvae are given to aid diagnosis of infections.

H. D. Crofton

- 2202**—BHATIA, B. B. & PANDE, B. P., 1961. [Department of Parasitology, Uttar Pradesh College of Veterinary Science and Animal Husbandry, Mathura, India.] "On the common helminthic infections of the large intestine in Indian sheep with remarks on the two of the pathogenic species." **Indian Journal of Helminthology**, 13 (1), 1–22.

Bhatia & Pande have made collections of helminths from plain, hill and Tibetan sheep at slaughterhouses in Mathura, Almora and Nainital. The following parasites are described and figured with brief notes on their pathogenesis: *Chabertia ovina*, *Oesophagostomum asperum*, *O. columbianum*, *Skrjabinema ovis*, *Trichuris globulosa* and *T. ovis*. Eggs of *O. columbianum* teased from adult females were successfully reared *in vitro* to the infective stage. Within the intestinal nodules those fourth-stage larvae of *O. columbianum* destined to become females have a long tail ending in a small knob-like structure, whereas those destined to become males have a shorter tail ending bluntly.

J. W. Smith

- 2203**—BRUNSDON, R. V., 1960. [Wallaceville Animal Research Station, Department of Agriculture, Private Bag, Wellington, New Zealand.] "Studies on the epizootiology of *Nematodirus* infestation in sheep in New Zealand." **New Zealand Journal of Agricultural Research**, 3 (5), 772–778.

On sheep pastures in Wallaceville, New Zealand there is a small peak of larval *Nematodirus* population in the spring followed by a higher larval peak in the autumn. When lambs are grazed continuously on infected pasture they normally acquire *Nematodirus* infection in the spring which continues through the summer and autumn and disappears in the winter, the level of infection being unaffected by the autumn larval peak. In a trial in 1959 worm-free lambs and worm-free two-tooths were put on to infected pasture just before the autumn larval peak; these lambs acquired heavier infections than lambs infected in the spring and the two-tooths acquired infections which were lighter than either those of the spring-infected or autumn-infected lambs. Both these autumn infections disappeared at about the same time as the spring infections. These results indicate that older sheep possess some measure of age resistance to *Nematodirus* infection. Reference is made to the work of other authors on the epizootiology of *Nematodirus* infection.

J. W. Smith

- 2204**—BUTOZAN, V., TOMIĆ, L. & HORVATIĆ, I., 1961. [Veterinarski fakultet, Univerzitet u Sarajevu, Sarajevo, Yugoslavia.] "Uloga anaerobne infekcije (*Cl. welchii* tip A) u akutnoj metiljavosti ovaca." **Veterinaria. Sarajevo**, 10 (1), 9–23. [English summary p. 9.]

During an epizootic of acute liver-fluke disease (1959–60) in Yugoslavia when about 25,000 sheep died or were slaughtered as an emergency measure, it was discovered that *Clostridium welchii* type A, played an important role as a concomitant infection. The flukes concerned were mainly *Dicrocoelium dendriticum* and, to a lesser extent, *Fasciola hepatica*. Bacterial infection was restricted to the regions affected by the acute liver-fluke disease. Mortality ceased after treatment and prophylaxis.

N. Jones

**2205**—CONDY, J. B., 1961. [Veterinary Research Laboratory, Salisbury, Southern Rhodesia.] "Seasonal fluctuations in the worm egg counts of sheep in Southern Rhodesia." **British Veterinary Journal**, **117** (4), 152-157.

Both "spring" and "post-partum" rises in worm egg counts occur in sheep in Southern Rhodesia. Provided that adequate food supply is available, autumn lambing is desirable since weather conditions in winter are much less suitable for larval survival on pasture. A three-day grazing rotation and low level phenothiazine dosing of ewes at lambing time is advised.

W. M. Fitzsimmons

**2206**—DELIĆ, S., 1961. [Zavod za parazitologiju i invazione bolesti, Veterinarski fakultet, Univerzitet u Sarajevu, Sarajevo, Yugoslavia.] "Neka opažanja o parazitima probavnog trakta ovaca u Bosni i Hercegovini tokom 1958 i 1959 godine." **Veterinaria. Sarajevo**, **10** (1), 43-50. [English summary p. 43.]

Delić lists the three cestode and 21 nematode species found in the gastro-intestinal tract of 240 lambs, yearlings and adult sheep in ten different localities in Bosnia and Hercegovina during 1958-59.

N. Jones

**2207**—ENZIE, F. D., COLGLAZIER, M. L., WHITMORE, G. E. & THOMPSON, D. E., 1960. "Effectiveness of three management systems on parasitism in lambs. III. Resistance of *Haemonchus contortus* to phenothiazine." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 41.

Before lambs and ewes were turned out to pasture, "clean" and contaminated as previously described [see abstracts Nos. 2211 and 2222 below], the ewes were dosed with 25 gm. or 37.5 gm. phenothiazine (average particle size about  $10\mu$ ) according to weight. All lambs and ewes had continuous access to 1:9 phenothiazine-mineral mixture. Subsequently therapeutic treatment for *Haemonchus contortus* was given but this was delayed in order to assess the efficiency of the preventive measures. Satisfactory response was not obtained in either group and this strain of *H. contortus* appears to be equally or more resistant to phenothiazine than the strain reported on by Drudge *et al.*

S. Willmott

**2208**—FIELD, A. C., BRAMBELL, M. R. & CAMPBELL, J. A., 1960. [Biochemistry and Parasitology Department, Moredun Institute, Gilmerton, Edinburgh 9, Scotland.] "Spring rise in faecal worm-egg counts of housed sheep, and its importance in nutritional experiments." **Parasitology**, **50** (3/4), 387-399.

Field *et al.* investigated the spring rise in worm egg count in sheep housed under conditions designed to prevent re-infection. In one experiment ewes were brought indoors in early February and fed with hay and supplements. After lambing the ewes and their lambs were divided into three groups; one of these received the original diet and the other two received perennial rye-grass cut from plots, fertilized with nitrogen and potash and with potash only. Egg counts were carried out during the experiment and blood samples were taken before, during and after the rye-grass feeding period. Egg counts rose from the end of April, reaching a mean value of more than 4,000 e.p.g. by mid-May. There was no evidence that the grass feeding affected the egg count. A fall in packed red cell volume was closely correlated with the rise in egg count and this fall was not correlated with rye-grass feeding; there was some evidence that one type of rye-grass reduced the fall. In a second experiment starting in January ewe hoggs and wether hoggs were housed as before. Some of the ewe hoggs were mated and became pregnant. Egg counts were made at fortnightly intervals until the end of April and thereafter at weekly intervals. A very marked spring rise occurred in the ewe hoggs which lambed and a less marked one in some of the non-reproducing ewe hoggs and the wether hoggs. The authors discuss the various theories of spring rise and conclude that latent overwintering larvae play a major part in the phenomenon; they call attention to the importance of this in relation to experiments on nutrition.

H. D. Crofton

**2209**—HOVORKA, J. & CHLEBOVSKÝ, O., 1958. [Helmintologický ústav SAV, Košice, Czechoslovakia.] "K vekovej a sezónnej dynamike fasciolózy oviec." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, **31** (12), 935-946. [English, German & Russian summaries pp. 944-946.]

On the basis of examination of 1,451 sheep livers in Slovakia, it was found that (i) the incidence and degree of infection of sheep with fascioliasis increased with age; (ii) the maximum rate of



increase was during the second year of age; (iii) the incidence and degree of infection progressively diminished with the coming of spring; and (iv) the incidence of fascioliasis was highest in March and lowest in July in the lowland and submountainous zones, whereas in mountainous zones it was highest in December and lowest in August.

N. Jones

- 2210**—JANSEN, B. C., 1960. [Section of Bacteriology, Onderstepoort, South Africa.] "The occurrence of pulpy kidney in sheep dosed with phenothiazine." *Journal of the South African Veterinary Medical Association*, **31** (2), 209–210.

Jansen has shown experimentally that dosing with phenothiazine at therapeutic levels can induce the development of enterotoxaemia in animals with *Clostridium welchii* type D in their intestines. A circulating antitoxin level higher than 0.1 Wellcome unit per ml. of sera will protect sheep against the development of enterotoxaemia subsequent to dosing phenothiazine.

R. K. Reinecke

- 2211**—KATES, K. C. ET AL., 1960. "Effectiveness of three management systems on parasitism in lambs. I. Clinical effects of parasitisms relative to exposure and medication." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 40.

Three groups each of more than 100 lambs were raised (i) on permanent dry lot and fed pellets and hay ad lib., (ii) rotated on "clean" pasture and fed pellets ad lib. and (iii) rotated on contaminated pasture and fed pellets ad lib. All were on continuous phenothiazine-salt prophylaxis and the pasture groups were treated with phenothiazine or copper sulphate as necessary. The levels of parasitism acquired were insignificant, moderate and high respectively, *Haemonchus contortus* and *Strongyloides papillosus* being the dominant parasites in groups ii and iii. Group i made ideal growth and group iii the poorest weight gains and in group iii about 9% died from parasitism.

S. Willmott

- 2212**—KHAN, C. K. A., 1961. [Mysore Serum Institute, Hebbal, Bangalore-6, India.] "Verminous gastro-enteritis and its influence on weight response in sheep." *Indian Veterinary Journal*, **38** (3), 136–141.

Khan studied the influence of phenothiazine dosing on weight gains of infected sheep on nematode-contaminated pastures under local conditions in India. There was some indication that treated sheep gained more weight than controls.

W. M. Fitzsimmons

- 2213**—KIBAKIN, V. V., 1960. [Epizootiology of fascioliasis in sheep in the Tashauz region of the Turkmen S.S.R.] *Trudi Turkmenskogo Nauchno-Issledovatel'skogo Instituta Zhivotnovodstva i Veterinarii*, **2**, 257–266. [In Russian.]

*Fasciola gigantica* is the principal cause of fascioliasis in sheep in the Turkmen S.S.R. Its larvae were found in 32% of *Radix lagotis*, 27% of *R. ovata*, 34% of *R. pereger*, 16% of *Galba truncatula* and 10% of *Physa acuta*. 100 specimens of each of these snails were examined. Experimental infections were successful with all the snails except *P. acuta*. The optimum temperature for development of the eggs was 37°C.; eggs did not survive the winter on the pastures.

N. Jones

- 2214**—LEVINE, N. D., SCHAEFFLER, W. F. & SZANTO, J., 1960. "The effect of early weaning on acquisition of gastrointestinal nematodes by lambs." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 41–42.

During the 1958 grazing season one group of ten lambs was weaned abruptly and placed on an 0.5 acre brome grass-lucerne pasture; ten other lambs with their ten mothers were placed on a 1.25 acre pasture. There were no significant differences in strongyloid and *Strongyloides papillosus* egg counts or in weight gains between the two groups of lambs. This was attributed to the fact that the pasturage was very lightly grazed. In 1959 this was repeated placing lambs on an 0.62 acre pasture and lambs with their mothers on a 1.0 acre pasture. By July the pastures had been grazed off almost completely and had to be increased. Lambs with their mothers became very heavily parasitized and eight of the ten died. The weaned lambs did not become heavily parasitized but did not do well due to the poorness of the pasture.

S. Willmott

- 2215—MELDAL-JOHNSON, C. M., MULLER, G. L. & THOMAS, R. J., 1960. [Department of Agriculture, Private Bag, Hamilton, New Zealand.] "The use of a 'Neguvon-Asuntol' mixture as an anthelmintic for sheep." *Journal of the South African Veterinary Medical Association*, 31 (2), 235-241.

Naturally infected sheep at King William's Town, Mossel Bay & Ermelo were used. The efficiency of a mixture of 10 parts Neguvon to one part Asuntol (after copper sulphate prestimulation) was assessed on the percentage reduction in faecal egg counts, using the McMaster egg counting technique: the species, apart from *Nematodirus* spp. and *Strongyloides*, were assessed on a differential basis, from percentages present in larval cultures. Pre- and post-dosing counts were made. The mixture was highly effective (80% to 100% reduction in egg count) against *Haemonchus contortus* and *Trichostrongylus* spp. at 50 mg. per kg. body-weight and against *Ostertagia*, *Cooperia*, *Nematodirus* and *Bunostomum* at 77 mg. to 110 mg. per kg. It was not effective against *Oesophagostomum columbianum*, *Chabertia ovina* or *S. papillosus* even at the higher dosage rates. Its range is similar to phenothiazine apart from its lack of effect against *O. columbianum*. The authors conclude that assessing anthelmintic efficiency by egg counts alone is unsatisfactory; care should be taken when using these drugs until more is known about their toxicity.

R. Reinecke

- 2216—MITTERPAK, J., 1958. [Helmintologický ústav SAV, Košice, Czechoslovakia.] "Profylaktická dehelmintizácia, základ boja s fasciolózou domácich zvierat." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 31 (12), 981-992. [English, German & Russian summaries pp. 990-992.]

When 9,952 sheep with fascioliasis were treated with the following preparations the average rates of cure were: (i) Motolit 0 (hexachlorethane produced in Czechoslovakia), 73.7%; (ii) Igitol (hexachlorethane produced in Germany), 82.4%; (iii) carbon tetrachloride *per os*, 90.5%; (iv) carbon tetrachloride subcutaneously, 6.1%; (v) Distol express (carbon tetrachloride and filicin), 85.5%; (vi) Sheep Distol, 59.9%. The average reductions in the worm burden were respectively: (i) 61.8%; (ii) 75.7%; (iii) 68.4%; (iv) 52.2%; (v) 62.2%; (vi) 45.9%. Only individual juvenile flukes were found dead at autopsies. A treatment devised by the author which consists of the simultaneous administration of 1 ml. carbon tetrachloride per 25 kg. body-weight subcutaneously and 4 gm. of hexachlorethane (Motolit 0) *per os*, was tested on 4,477 sheep. The average rate of cure was 95.8% and the degree of infection was reduced on the average by 83.2%. This combined treatment was also much more effective against juvenile flukes than when the drugs were applied separately.

N. Jones

- 2217—OREKHOV, M. D., 1960. [Epizootiology of monieziasis in sheep and goats and its control in the Turkmen S.S.R.] *Trudi Turkmenskogo Nauchno-Issledovatel'skogo Instituta Zhivotnovodstva i Veterinarij*, 2, 267-288. [In Russian.]

The distribution of monieziasis of sheep and goats in the Turkmen S.S.R. coincides with that of the intermediate hosts *Galumna flagellata*, *Galumna* type *minor*, *Scheloribates laevigatus* and *S. latipes*. *Moniezia expansa* and *M. benedeni* occurred in adult as well as in young animals but their incidence was much lower in adults. *Thysaniezia* infection predominated among adults; *Avitellina* and *Stilesia* were also observed. The development of *Moniezia* cysticercoids in the mites took 94 days. The following drugs were used in therapeutic doses against monieziasis: aminoacrichin in eight, lead arsenite in 95 and tin arsenate in 438 lambs and kids. The cure rates were 75%, 95.6% and 67% respectively. Copper sulphate was also tested in a 1% solution on 42 and in a 2% solution on 143 lambs and kids and 88.1% and 100% of animals respectively were cured. The treatments were carried out after food and water had been withheld for 12 hours.

N. Jones

- 2218—PANDE, B. P. & BHATIA, B. B., 1960. [Department of Parasitology, U. P. College of Veterinary Science and Animal Husbandry, Mathura, U.P., India.] "On *Ogmocotyle indica* (Bhalerao, 1942) Ruiz, 1946 (Trematoda), the notocotylid monostome of Indian ovines, and its pathogenicity." *Journal of Parasitology*, 46 (6), 800-802.

Pande & Bhatia indicate that the pathogenicity attributed to *Ogmocotyle indica* in sheep and goats is largely due to the activities of certain nematode species, especially *Trichostrongylus colubriformis* and *Strongyloides papillosus*.

E. I. Sillman



**2219**—SARWAR, M. M. & BARYA, M. A., 1960. [Chadda Building, Khawja Dil Mohammad Road, Lahore, West Pakistan.] "Effect of small doses of phenothiazine on the development of larvae of *Dictyocaulus filaria* in sheep." *Biologia. Lahore*, **6** (2), 181–184.

The feeding of phenothiazine at the rate of 0.5 gm. daily prevented the development of *Dictyocaulus filaria* larvae in the faeces of sheep. When the drug was given at the rate of 0.25 gm. daily a noticeable reduction in the number of larvae recovered from the cultures was observed but the results were not conclusive. Larvae from sheep which had received daily doses of 0.5 gm. and 0.25 gm. of phenothiazine appeared normal but those from sheep receiving 1.0 gm. showed signs of degeneration.

M. M. Sarwar

**2220**—SCHAEFFLER, W. F., 1960. "Experimental infection of sheep with the dog ascarid, *Toxocara canis*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 17.

No clinical signs due to infection with *Toxocara canis* larvae were observed in eight sheep and ten yearling lambs infected experimentally. Lesions consisting of haemorrhages, infiltration with mononuclear cells, neutrophils and especially with eosinophils, and focal necrosis occurred in the intestinal lymph nodes, liver and lungs but few cellular changes were observed around actively migrating larvae in the brain and other organs. The only significant blood change was a high eosinophilia.

S. Willmott

**2221**—SYUI, S. T. & BOEV, S. N., 1960. [Lung nematodes of sheep in the Gansu Province of the Chinese People's Republic.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, **12**, 109–114. [In Russian.]

*Dictyocaulus filaria* were found in four of seven sheep, *Protostrongylus hobmaieri* in two and *Spiculocaulus kwongi* (Wu & Lu, 1943) in four examined in the Gansu Province. Hitherto only *S. kwongi*, *P. skrjabini* and *Bicaulus schulzi* have been reported as lung nematodes in China. In a supplementary description of *S. kwongi* the authors note that the dorso-lateral ray has five papillae, not six as described by Wu & Lu, and that of three types of females (small, medium and large) attributed to this species by these authors, only the large one is considered to belong to it. The paper contains six diagrams.

N. Jones

**2222**—TURNER, J. H. ET AL., 1960. "Effectiveness of three management systems on parasitism in lambs. II. Kinds and levels of parasitisms relative to exposure, medication, and weather." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 40–41.

Groups of lambs were maintained as described previously [see abstract No. 2211 above]. Group ii acquired moderate infections of *Haemonchus contortus* by mid-summer and moderate to high infections of *Strongyloides papillosus* in August and September. Group iii acquired significant *H. contortus* infections in June, reaching a peak in July; this infection then declined as a result of treatment and other factors. *S. papillosus* increased to high levels in August and September. Other helminths recovered from both groups were *Moniezia expansa*, *Nematodirus* spp., *Ostertagia* spp., *Trichostrongylus* spp., *Cooperia curticei* and *Oesophagostomum venulosum*. A phenothiazine-salt regimen did not prevent acute haemonchiasis from developing in some lambs in group iii.

S. Willmott

**2223**—TURNER, J. H. & WILSON, G. I., 1960. "The effect of three different exposures to parasitism on the serum proteins of Shropshire lambs." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 29.

The serum protein values for three groups of lambs was studied over ten months. The first group was raised helminth-free, the second acquired minimal infections of *Strongyloides papillosus* and the third relatively heavy infections with various trichostrongyles, *Oesophagostomum* spp. and *S. papillosus*. Average albumin to globulin ratios declined steadily in the heavily parasitized group but increased steadily in the two others.

S. Willmott

**2224**—ULYANOV, S. D., 1960. [Seasonal and age dynamics of the more important helminthiases of sheep in south-eastern Kazakhstan.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, **12**, 120–136. [In Russian.]

The dynamics of some helminthiases in south-eastern Kazakhstan were studied by either autopsies or faecal examinations of 300 sheep, yearlings and lambs per season. The seasonal

dynamics varied with these age groups in *Dictyocaulus*, *Marshallagia* and *Momiezia* infections. They were more or less similar in adults and yearlings in the case of *Ostertagia*, *Chabertia*, *Dicrocoelium*, *Eurytrema* and *Thysaniezia* infections. The dynamics of *Haemonchus* infection resembled those of *Ostertagia*. The incidence of *Dicrocoelium* and *Eurytrema* was higher among adult sheep than among yearlings and lambs. N. Jones

**2225**—VODRÁŽKA, J., BERECKÝ, I. & SOKOL, J., 1958. [Katedra farmakológie, Veterinárská fakulta, Košice, Czechoslovakia.] "K otázke účinnosti emetinu pri müllerioze oviec." *Folia Veterinaria*, Košice, 2 (1/2), 147–153. [English, German & Russian summaries pp. 152–153.] Three doses of emetine hydrochloride, each of 3 mg. per kg. body-weight, administered intramuscularly at two-day intervals, suppressed the passage of *Muellerius* larvae in three of nine sheep. The results were checked for 14 weeks after treatment. In four other sheep the treatment resulted in a considerable reduction in the number of larvae whereas in two further cases there was only a temporary reduction. In the meantime one spontaneous cure was observed among ten control sheep, two of which died. N. Jones

**2226**—VODRÁŽKA, J., SOKOL, J. & BERECKÝ, I., 1958. [Katedra farmakológie, Veterinárská fakulta VŠP, Košice, Czechoslovakia.] "Príspevok k hodnoteniu hetrazánu ako antihelminatika u domácich zvierat. I. Zpráva. Sledovanie účinnosti proti *Müllerius capillaris* u oviec." *Folia Veterinaria*, Košice, 2 (1/2), 135–145. [English, German & Russian summaries pp. 144–145.] Hetrazan was used in numerous tests against *Muellerius capillaris* in sheep. Various doses were given orally and/or parenterally and it was concluded that it had no reliable effect against muelleriasis in sheep; this is contrary to the conclusions drawn by Ozerskaya [for abstract see Helm. Abs., 22, No. 996cs]. N. Jones

**2227**—ZMORAY, I., 1958. [Helmintologický ústav SAV, Košice, Czechoslovakia.] "Rozbor strát spôsobených fasciolózou u poistených oviec na Slovensku v rokoch 1954–1957." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 31 (12), 925–934. [English, German & Russian summaries pp. 933–934.] Zmoray describes the incidence and dynamics of fascioliasis in sheep in Slovakia from 1954 to 1957. The tendency of the losses caused by it to decrease in some districts is attributed mainly to better control and especially to the method of treatment developed by Mitterpák [for abstract see No. 2216 above]. N. Jones

### Pigs

**2228**—BECHT, H., 1960. [Veterinär-Parasitologisches Institut der Justus Liebig-Universität Giessen, West Germany.] "Beitrag zur Serologie der Metastrongylusinfektion des Schweines." *Deutsche Tierärztliche Wochenschrift*, 67 (7), 177–180. [English summary p. 180.] The author used Boyden's technique of indirect haemagglutination to demonstrate the presence of antibodies to *Metastrongylus* in infected pigs. The antibodies could be found 15 days after the initial infection and continued to increase during the 35-day period when the animals were examined. The route of infection, whether intravenous or oral, had no effect on the presence of antibodies. The oral precipitates were also seen with third-stage larvae and immune serum but the presence of precipitates did not hasten their death. K. R. Heath

**2229**—BEYR, J., 1957. "Parazitický červ u prasat-hádě prasečí—*Strongyloides ransomi* (Schwarz Alicata)." *Časopis Národního Musea*, 126 (2), 167–171. [English summary p. 171.] *Strongyloides ransomi* appears to be wide-spread in pig-breeding farms in Czechoslovakia. Previous reports have identified the parasite as *S. papillosus* but the authors have made a careful study of all stages and conclude that it is *S. ransomi*. The potential dangers of this infection, especially with reference to the spread of infectious diseases, are stressed. S. Willmott



- 2230—BREZA, M.**, 1960. [Katedra parazitologie a invaznych chorob, Veterinárska fakulta, Košice, Czechoslovakia.] "K otázke epizootologického významu karečno-nutritívnej koprofágie a alotriofágie, najmä pri chorobách mládat parazitárneho a iného pôvodu." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, 33 (7/8), 569–584. [German & Russian summaries pp. 582–584.]

From the literature and personal observations on metastrongylosis in pigs, Breza concludes that a craving for unnatural food is not only a symptom of the infection, but is primarily an instinctive attempt to restore the disturbed metabolic balance.

N. Jones

- 2231—BRODY, G. & WUEST, E. C.**, 1960. "Activity of dithiazanine iodide administered in feed against larval infections of *Ascaris suum* in young pigs." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 9.

Dithiazanine iodide at 0.04% in the feed showed activity against *Ascaris* larvae in experimentally infected young weanling pigs. Liver damage caused by the migrating larvae was not prevented.

S. Willmott

- 2232—CHIU, J. K.**, 1959. "*Gnathostoma doloresi* Tubangui, 1925 (Nematoda: Gnathostomidae) found in Formosan wild boar." **Journal of the Formosan Medical Association**, 58 (5), 261–268.

Chiu re-investigated the distribution and species of *Gnathostoma* in Taiwan and found no parasites in the stomachs of several hundreds of dogs, cats and pigs which he examined. No larval forms were found in about 300 fresh-water fish belonging to several species. In a wild boar (*Sus leucomystax taiwanus*), however, he found 12 worms and identified them as *G. doloresi* Tubangui, 1925. These are described and the cuticular spines from different parts of the body of the adult worm are illustrated. The egg is also illustrated and contrasted with that of *G. hispidum* by its smaller size and the presence of a mucoid plug at each end. Two other lots of previously collected specimens were also examined and identified, viz., *G. doloresi* from the stomach of wild boar and *G. hispidum* from the stomach of swine. The author lists 18 species of *Gnathostoma* and tabulates the differential characters of the four species common in the Far East, viz., *G. spinigerum*, *G. hispidum*, *G. doloresi* and *G. nipponicum* and, in more detail, the differential characters of *G. doloresi* and *G. hispidum*, the occurrence of which in Taiwan is now established.

J. J. C. Buckley

- 2233—COLGLAZIER, M. L. & ENZIE, F. D.**, 1960. [Animal Disease & Parasite Research Division, ARS, U.S.D.A., Beltsville, Maryland, U.S.A.] "Anthelmintic trials with hygromycin in pigs." **Journal of Parasitology**, 46 (6), 796.

Trials indicated that 12 million units of hygromycin per ton of feed fed to pigs over a period of 35 days had an anthelmintic action but no favourable effect on weight gains.

W. M. Fitzsimmons

- 2234—COLGLAZIER, M. L. & ENZIE, F. D.**, 1960. [Animal Disease & Parasite Research Division, ARS, U.S.D.A., Beltsville, Maryland, U.S.A.] "Comparative trials with some present-day anthelmintics for swine." **Journal of Parasitology**, 46 (6), 808.

Trials in small groups of cull pigs indicated that of four anthelmintics tested hygromycin alone appeared to be effective against whipworms; sodium fluoride, piperazine citrate and hygromycin controlled ascarids and nodular worms; cadmium oxide was not effective against whipworms, ascarids or nodular worms in pigs.

W. M. Fitzsimmons

- 2235—DONE, J. T., RICHARDSON, M. D. & GIBSON, T. E.**, 1960. [Central Veterinary Laboratory, Weybridge, Surrey, England.] "Experimental visceral larva migrans in the pig." **Research in Veterinary Science**, London, 1 (2), 133–151.

Experiments are described in which pigs between three-and-a-half to four-and-a-half weeks old were fed standard doses of embryonated eggs of *Toxascaris leonina* and *Toxocara canis*. With the former, larvae and lesions were confined to the alimentary canal, omentum and liver, migration occurred transperitoneally, and little damage was caused. With *T. canis* lesions, varying in severity with the dosage of eggs, were noted in the small intestine, large intestine,

liver, lung, heart, brain and lumbar cord (at high doses only), kidney, lymph nodes, various muscles, thyroid, pancreas, adrenal and salivary glands; larvae were recovered from the intestine, liver, lungs, heart, brain and lumbar cord, kidney, lymph node, masseter, diaphragm and limb muscles. The spleen was free of both larvae and lesions. Clinical symptoms of ataxia and paraplegia were noted from a month after infection in some cases. This experimental disease is discussed in relation to visceral larva migrans in other species and to other nervous diseases of the pig. The description of the lesions is illustrated by photographs and photomicrographs.

W. M. Fitzsimmons

**2236**—RODRIGUEZ A., H., BAUER M., R. & PERRIER A., P., 1960. [Sección Triquinoscopía del Matadero Municipal de Santiago, Chile.] "Triquinosis porcina." **Boletín Chileno de Parasitología**, **15** (4), 85–86.

**2237**—SEN, H. G., 1960. [University of Nebraska, U.S.A.] "Bionomics of lungworms of swine." **Dissertation Abstracts**, **21** (6), 1674–1675.

**2238**—SHUMARD, R. F. & HENDRIX, J. C., 1960. "Studies on the efficacy of dithiazanine iodide against migrating *Ascaris suum* larvae in pigs." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 9.

Dithiazanine iodide at 0.04% in the feed for periods of 7 to 21 days after experimental infection inhibited the migration of *Ascaris* larvae in pigs. The inhibition was usually in the liver and larvae were generally inhibited in the second stage although third-stage larvae were observed.

S. Willmott

**2239**—ZAVADIL, R., 1960. [Katedra parazitologie a invazních chorob VF VŠZ, Brno, Czechoslovakia.] "Ekonomicky závažné parazitózy mladých prasat." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, **33** (7/8), 563–568. [German & Russian summaries pp. 567–568.]

Zavadil outlines some aspects of ascariasis in young pigs. The author used Breza's solution (1 : 1 magnesium sulphate and sodium sulphite) in faecal examinations. The advantages of this solution are a relatively high specific weight and slow crystallization.

N. Jones

### Rabbits and Hares

**2240**—ZAJÍČEK, D., 1958. [Statní vědecký veterinární ústav, Prague, Czechoslovakia.] "K otázce hepatikózy u našich zajíců." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, **31** (3), 211–216. [English, German & Russian summaries pp. 215–216.]

*Hepaticola hepatica* infection had caused the death of only one hare of 600 which were examined post mortem during a period of four years in Czechoslovakia.

N. Jones

### Cats and Dogs

**2241**—BAILEY, W. S., 1960. "The incidence of *Spirocerca lupi* and *Dirofilaria immitis* in dogs in the Philippine Islands." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 28.

*Spirocerca lupi* was present in 147 of 322 dogs and *Dirofilaria immitis* in 40 of 210, all collected from the streets of Manila and none less than six months old.

S. Willmott

**2242**—BURROWS, R. B. & LILLIS, W. G., 1960. [Wellcome Research Laboratories, Tuckahoe, New York, U.S.A.] "*Eurytrema procyonis* Denton, 1942 (Trematoda: Dicrocoeliidae), from the domestic cat." **Journal of Parasitology**, **46** (6), 810–812.

*Eurytrema procyonis* is redescribed and figured from the bile-ducts, gall-bladder and pancreatic ducts of the domestic cat in New Jersey, U.S.A. This is a new host record. A comparison of



the dimensions of the acetabulum and oral sucker, and the position of the vitellaria and genital pore in 30 flukes from the cat lends support to the view that the genus *Concinnum* and a number of other dicrocoeliid genera are not distinguished readily from *Eurytrema*.

W. M. Fitzsimmons

**2243**—CHAPMAN, N. F. & SMITH, A. W., 1961. [U.S.A.F. Hospital Tachikawa, APO 323, San Francisco, California, U.S.A.] "Effects of dithiazanine iodide on *Dirofilaria immitis* in dogs." **Journal of the American Veterinary Medical Association**, **138** (11), 605–607.

In the control of *Dirofilaria immitis* infection of dogs, mosquito control, blood-testing every six months for the presence of microfilariae, treatment with arsenicals to eliminate adult worms and treatment with dithiazanine [?dithiazanine] iodide for microfilarial infection are recommended. Experiments show that this compound is not effective against adults or against migrating larvae or immature *D. immitis* but that it is a good microfilaricide in a dosage as low as 25 mg. per lb. body-weight.

W. M. Fitzsimmons

**2244**—CLARKSON, M. J. & OWEN, L. N., 1960. [The Liverpool School of Tropical Medicine and the Faculty of Veterinary Science, University of Liverpool, Liverpool, England.] "The species of *Trichuris* in the domestic cat." **Journal of Helminthology**, **34** (3/4), 319–322.

Clarkson & Owen obtained 100 *Trichuris campanula* from three of 21 domestic cats from the Bahamas. The present and previous descriptions of *T. campanula* are compared with the description of *T. serrata*; the authors conclude that both are valid species.

J. W. Smith

**2245**—DUCKER, D. J., 1961. "*Spirocerca lupi* (Rudolphi, 1809) as a cause of Marie's disease in the dog." **Veterinary Record**, **73** (10), 242–243.

A case of hypertrophic osteoarthropathy (Marie's disease) due to the presence in the thorax of a *Spirocerca lupi* nodule is described. The clinical post-mortem findings are given in some detail and particular attention is given to the hypertrophic osteo-periostitis in the long bones.

W. M. Fitzsimmons

**2246**—FITZSIMMONS W. M., 1961. [Commonwealth Bureau of Helminthology, St. Albans, Herts, England.] "*Bronchostrongylus subcrenatus* (Railliet & Henry, 1913) a new parasite recorded from the domestic cat." **Veterinary Record**, **73** (5), 101–102.

*Bronchostrongylus subcrenatus*, previously only known from the leopard and the tiger, is recorded for the first time from a new host, the domestic cat, in Blantyre, Nyasaland. It is briefly redescribed, the male is figured and its differentiation from *Aelurostrongylus abstrusus* is given. The probable life-history is outlined.

W. M. Fitzsimmons

**2247**—FITZSIMMONS, W. M., 1961. [Commonwealth Bureau of Helminthology, 103, St. Peter's Street, St. Albans, Herts, England.] "The so-called cat and dog strains of *Ancylostoma caninum*." [Correspondence.] **Veterinary Record**, **73** (23), 585–586.

From an examination of hookworms from cats and dogs collected in Nyasaland and others received from Australia, Fitzsimmons confirms the conclusions of Biocca (1954) and Rohde (1959) [for abstracts see Helm. Abs., **23**, No. 503e and **30**, No. 776] that the species in the cat and in the dog are morphologically distinct, that in the former being *Ancylostoma tubaeforme* (Zeder, 1800) and that in the latter *A. caninum* (Ercolani, 1859).

R. T. Leiper

\***2248**—GEHRING, H., 1957. "Piperazinatzitrat Tasnon als Spulwurmmittel bei Hund und Katze." **Kleintier-Praxis**, **2** (4), 111–114. [English summary.]

**2249**—KNAPP, S. E., BAILEY, R. B. & BAILEY, D. E., 1961. [Department of Veterinary Medicine, Oregon State College, Corvallis, Oregon, U.S.A.] "Thelaziasis in cats and dogs—a case report." **Journal of American Veterinary Medical Association**, **138** (10), 537–538.

Knapp *et al.* report the finding of *Thelazia californiensis* in the eyes of two cats and one dog from Roseburg, Oregon. Since none of these animals was known ever to have left the area the infection is probably indigenous. No information regarding the intermediate host of the parasite was available.

J. W. Smith

- 2250—MACKENZIE, A., 1960. [Agricultural Research Council, Field Station, Compton, Berkshire, England.] "Pathological changes in lungworm infestation in two cats with special reference to changes in pulmonary arterial branches." **Research in Veterinary Science**, London, 1 (3), 255-259.

*Aelurostrongylus abstrusus* infection in two 12-week-old kittens caused extensive patchy consolidation in the lungs resembling pulmonary tuberculosis. Bacteriological examination of lungs and associated lymph glands was negative. Eggs and larvae were abundant; young adults were found in the parenchyma, not in a bronchus or in the pulmonary artery. The pneumonic histological changes are described in detail; of these, the absence of the bronchiolar muscular hypertrophy which is seen in metastrongyle infections of pigs, and the presence of severe muscular hypertrophy and hyperplasia in the media and intimal proliferation of the pulmonary arteries are of particular interest. The cause of the latter condition, well known in cats, has remained unexplained and Mackenzie suggests that there may well be some correlation between it and lungworm infection and that it is likely that there is a more intimate relationship between the vascular system and lungworms in the cat than in other species. Photomicrographs illustrate the paper.

W. M. Fitzsimmons

- 2251—RAWES, D. A., 1961. [Wellcome Veterinary Research Station, Frant, Sussex, England.] "The activity of bephenium hydroxynaphthoate against hookworms in the dog." **Veterinary Record**, 73 (16), 390-392.

Rawes has investigated the activity of bephenium hydroxynaphthoate against *Ancylostoma caninum* and *Uncinaria stenocephala* in dogs. The minimum effective dose was 50 mg. of bephenium base per kg. body-weight given morning and evening; a single dose of 100 mg. per kg. was not so effective. The results obtained using other regimens of the drug are tabulated. Vomiting, which occurred in a number of cases, was more frequent when the drug was given in tablet form than when given in gelatin capsules.

J. W. Smith

- 2252—ROTHSTEIN, N., KINNAMON, K. E., BROWN, M. L. & CARITHERS, R. W., 1960. "Canine microfilariasis in eastern United States." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 28.

Of 600 dogs from Alabama, 649 from Pennsylvania and 69 from Rhode Island, 244, 31 and two respectively harboured microfilariae. *Dirofilaria immitis*, *Dipetalonema* n.sp. [neither named nor described] and a third type of microfilaria were present.

S. Willmott

- 2253—SMIT, J. D., 1960. [Veterinary Research Laboratories, P.O. Onderstepoort, Transvaal, South Africa.] "*Capillaria hepatica* infestation in a dog." **Onderstepoort Journal of Veterinary Research**, 28 (3), 473-478.

Smit reports the first record from South Africa of *Capillaria hepatica* infection in a dog (an eight-year-old male Bull Mastiff). Post-mortem examination revealed no adult parasites; eggs were found in the liver. The main gross and histopathological changes and the cause of death of the dog are discussed. Smit expresses the opinion that disintegration of adult worms was responsible for an allergic state in the body, leading to generalized calcification of the intima of the blood vessels. Photomicrographs illustrate *C. hepatica* eggs and various necrotic tissues of the dog.

J. W. Smith

- 2254—THIER, L., 1957. "Versuche über die Verwendbarkeit des Hexylresorcins als Anthelminthicum beim Hund." **Dissertation, Munich**, 51+vii pp.

The hexylresorcinol preparation by Firma Riedel de Haen near Hanover was tested for its toxicity and efficacy in dogs. Doses varying from 0.05 gm. per kg. body-weight (in gelatin capsules) given to dogs on an empty stomach and followed by castor and paraffin oil, did not affect the general condition and blood picture of the dogs but there was a tendency to nausea and the indican content of the urine was increased; histological examination showed necrotic and inflammatory changes in the gastro-intestinal mucosa of almost all dogs. A similar method of administration was used in the therapeutic tests on 28 naturally infected dogs. A single dose of 0.05 gm. per kg. cured ascariasis in 18 out of 27 dogs but single or repeated doses of 0.05 gm. or 0.10 gm. per kg. cured ancylostomiasis in only two out of eight dogs. The efficacy of the drug therefore proved to be relatively low.

G. I. Pozniak



## Fur-Bearing Animals

**2255**—McTAGGART, H. S., 1960. [Department of Medicine, Royal (Dick) School of Veterinary Studies, University of Edinburgh, Edinburgh, Scotland.] "Helminths from the alimentary canal of farm mink in Britain." *Journal of Helminthology*, **34** (3/4), 247-258.

McTaggart examined the gastro-intestinal tracts of 200 *Mustela vison* from 42 farms. No helminths were found in the stomach of any mink. Measurements of the eggs and adults of *Cryptocotyle lingua* (from 12 mink) and a description of *Corynosoma hadweni* (from four mink) are given. A table compares *C. hadweni* with *C. strumosum*. In two mink eggs and infective larvae of *Strongyloides* sp. and eggs of *Capillaria* sp. were found. *Fasciola hepatica* eggs were found in 12 mink; eggs of *Moniezia* sp. and larvae of *Dictyocaulus filaria* and *Muellerius capillaris* were each found in one mink. McTaggart concludes that helminths do not constitute an important hazard on mink farms in Britain.

J. W. Smith

## Laboratory Animals

**2256**—CROSS, JR., J. H. & SCOTT, J. A., 1960. "*Nematospiroides dubius* in the Mongolian gerbil." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 38.

*Meriones unguiculatus* was susceptible to a primary infection with *Nematospiroides dubius* but eggs were only passed in the faeces for 21 to 32 days, compared with control mice which passed eggs for eight months. The gerbils were completely refractory to reinfection.

S. Willmott

**2257**—DUNN, M. C. & BROWN, H. W., 1960. "The effect of pregnancy on *Aspiculuris tetraptera* infections in albino mice." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 37.

It has been shown that pregnancy has no effect on the worm burden of *Aspiculuris tetraptera* in experimentally infected albino mice.

S. Willmott

**2258**—EL-RAWI, B. M., 1961. [Kansas State University, U.S.A.] "Adaptation of *Trichostrongylus colubriformis* and *T. axei* in domestic rabbits and guinea pigs." *Dissertation Abstracts*, **21** (10), 3201.

**2259**—GORYACHEV, P. P., 1960. [Chelyabinski meditsinski institut, U.S.S.R.] [Dwarf forms of *Opisthorchis felineus* obtained experimentally.] *Zoologicheski Zhurnal*, **39** (9), 1425-1426. [In Russian: English summary p. 1426.]

*Opisthorchis felineus*, only 1.4 mm. to 1.8 mm. in length, were obtained on infection of white mice with 10 to 20 metacercariae, while the 12 to 27 worms removed from guinea-pigs after similar infection with 30 to 50 metacercariae were within the normal size range of 6.1 mm. to 7.2 mm. Eggs, although fewer in number, were only a little smaller.

G. I. Pozniak

**2260**—HALEY, A. J. & CLIFFORD, C. M., 1960. [Public Health Service, National Institute of Allergy & Infectious Diseases, Rocky Mountain Laboratory, Hamilton, Montana, U.S.A.] "Age and infectivity of the filariform larvae of the rat nematode *Nippostrongylus brasiliensis* (Travassos, 1914)." *Journal of Parasitology*, **46** (5), 579-582.

Laboratory rats were inoculated intracutaneously with filariform larvae of *Nippostrongylus muris* three to 111 days old and were killed on the tenth day of infection. Larval age up to four weeks had little or no influence on the number of adult worms recovered; after this age the numbers varied and then decreased with increasing age. Only a few of the 111-day-old larvae developed into adults.

N. Jones

**2261**—HOAG, W. G., 1961. [Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine, U.S.A.] "Oxyuriasis in laboratory mouse colonies." *American Journal of Veterinary Research*, **22** (86), 150-153.

Hoag used 935 mice in an investigation of the pathology and methods of controlling or eliminating infections with *Aspiculuris tetraptera* and *Syphacia obvelata*. Piperazine hexahydrate and piperazine citrate were both effective. The most successful regimen consisted of administering

piperazine at a dose of 200 mg. per kg. body-weight daily in drinking water for seven consecutive days, then seven days with no drug, followed by a further seven days of medicated water. When piperazine citrate was given in the feed, treatment was ineffective. In a group of untreated mice with oxyuriasis five cases of rectal prolapse occurred; necropsy showed both the large intestine and caecum to be heavily infected with both *A. tetraptera* and *S. obvelata*. The authors suggest that rectal irritation caused by oxyurid infection may predispose to rectal prolapse in mice, particularly when infection is accompanied by the stresses of shipping and change in diet.

J. W. Smith

- 2262—JASKOSKI, B., 1960. [Department of Biological Sciences, Loyola University, Chicago, Illinois, U.S.A.] "Relation of age and fat reserves in swine ascarid eggs to infectivity in the hamster." *Experimental Parasitology*, New York, 10 (3), 333–336.

Jaskoski inoculated pig *Ascaris* embryonated eggs, varying in age from one to 48 months, into young *Cricetus auratus*. The percentage of fat in relation to body area decreased from 20% in one-month-old larvae to 0.8% in larvae 78 weeks old. The dosage of eggs necessary to cause fatal lung congestion in hamsters increased as the fat reserves in the larvae decreased; a comparable degree of lung congestion was caused by 400 one-month-old eggs per gm. of body-weight and 2,400 12-month-old eggs per gm. 1,900 48-month-old eggs per gm. caused no lung congestion. This evidence does not warrant the conclusion that the failure of infectivity of the eggs is due solely to the depletion of fat reserves; faecal examination of hamsters infected with 12-month-old eggs revealed a number of unhatched eggs. The minimum lethal dosage for the hamster was 400 eggs per gm. which is compared with that of 35 eggs per gm. for the guinea-pig, obtained by Kerr [for abstract see Helm. Abs., 7, No. 5a]. Jaskoski suggests that the small mucosal environment of the intestines of the hamster (compared with that of the guinea-pig) may be unfavourable to the hatching and penetration of larvae.

J. W. Smith

- 2263—KERSTEN, W. & BECHT, H., 1960. [Veterinär-Parasitologisches Institut der Justus Liebig-Universität Giessen, West Germany.] "Ein Beitrag zur Pathologie der Lungenwurminfektion." *Deutsche Tierärztliche Wochenschrift*, 67 (7), 173–177. [English summary pp. 176–177.]

The authors have studied by histological examination the migratory route of *Metastrongylus* larvae in experimentally infected guinea-pigs. Sections were taken commencing 12 hours after infection and continuing until the 14th day. The migratory route was by the intestine, to the mesenteries, lymphatic vessels and glands, heart and pulmonary vessels to the lungs and finally to the bronchi. The migration is distinguished by the track of polymorph leucocytes that were found together with the nodules of histiocytes containing larvae, or larval sheaths. In some instances foreign body giant cells were seen. The larvae were shown to reach the lungs in the third or fourth stage and ecdyses can take place in the intestinal tissue as well as in the lungs. The authors conclude that passage through the lymphatic glands is obligatory in the migration, this being confirmed when adult worms were found in the lungs of young pigs infected intravenously, and that the intestines are of greater importance than the lymphatics in protecting pigs against lungworm infection.

K. R. Heath

- 2264—LAGRANGE, E., 1960. [Institut Royal des Sciences Naturelles, Bruxelles, Belgium.] "La ponte d'oeufs abortifs dans la bilharziose à *Schistosoma mansoni*." *Bulletin de la Société de Pathologie Exotique*, 53 (5), 791–793.

Abortive eggs of *Schistosoma mansoni*, reduced to the external membrane, were found together with normal eggs in 80% of infected mice. These abnormal eggs were also found in the parasite.

N. Jones

- 2265—LEBEDA, M. & MACH, P., 1957. "Působení bílkovinného extraktu z askarid na organismus zvířat. I. Vztah toxických a anafylaktických účinků." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 30 (3), 215–226. [English, German and Russian summaries pp. 225–226.]

Protein extract of ascarids was injected intravenously into 24 adult rabbits. The first injections had an effect on the cardiovascular and respiratory systems, the intensity of which depended on the size of the dose. Repeating the injections produced much stronger reactions with gradually receding symptoms of anaphylactic shock.

N. Jones



**2266**—LEE, H. F., 1960. [Department of Tropical Medicine & Public Health, Tulane Medical School, New Orleans, Louisiana, U.S.A.] "Effects of superinfection on the behavior of *Toxocara canis* larvae in mice." *Journal of Parasitology*, **46** (5), 583–588.

Lee infected each of 20 mice, divided into four groups, with a total of 2,000 *Toxocara canis* larvae given in three, four, five or six spaced inoculations over a period of six weeks and killed them eight weeks after the first inoculation. In two control groups (of ten and four mice) mice were given 2,000 and 1,000 larvae respectively in single inoculations. The first control group was killed eight weeks, the second two weeks after inoculation. Three mice in the first control group died. Pepsin and trypsin digests were used for the recovery of larvae from the tissues. The order of decreasing numbers of larvae recovered from various locations was the carcass, liver, brain and lungs for the superinfected and second control groups, whereas, in the first control group the order was carcass, brain, liver and lungs. In the superinfected mice there was about 20% lower recovery of the inoculated larvae than in either control group, for which there is, at present, no explanation. There is no evident correlation between the degree of resistance, in terms of the number of larvae present, and the number of reinoculations the animals received. The relative abundance of larvae found in the liver of superinfected mice suggests that the mechanism of immunity does not operate in the intestine. Superinfection had no apparent effect on the extent of encapsulation but did increase the relative number of encapsulated larvae located in the liver. Lee suggests that it is possible by repeated inoculations of sublethal doses to induce a tolerance to *T. canis* infection.

J. W. Smith

**2267**—LUKASHENKO, N. P., 1960. [Gelmintologicheski otdel, Institut meditsinskoi parazitologii i tropicheskoi meditsini imeni E. I. Martinovskogo, Ministerstvo zdравookhraneniya SSSR, U.S.S.R.] [A study of the pathogenesis of experimental alveolar echinococcosis. I. The possibility of secondary (intraperitoneal) infection.] *Meditsinskaya Parazitologiya i Parazitarnie Bolezni. Moscow*, **29** (5), 601–606. [In Russian: English summary p. 606.]

*Sigmodon hispidus* were infected with *Echinococcus multilocularis* from a wild fox. Subsequently, 5,000 to 5,500 scoleces from alveolar cysts from the liver of one of these cotton-rats, killed 90 days later, were injected into the peritoneum of 110 cotton-rats and 30 albino mice and, in a second experiment, 750 to 800 scoleces obtained from a cotton-rat killed after 105 days were used to infect 48 cotton-rats and 20 albino mice. The animals were examined periodically between the second and 120th day after infection. 98 of the rats and 21 of the mice in the first experiment and all of the rats and 17 of the mice in the second became infected with alveolar hydatid. By the 80th to 118th day the infection had spread to most of the organs in the abdominal cavity and pelvic area.

G. I. Pozniak

**2268**—MOON, A. P., DUXBURY, R. E. & SADUN, E. H., 1960. "Maintenance of *Dirofilaria imformis* in laboratory animals." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 28–29.

Of various laboratory animals tested, suckling Dutch breed domestic rabbits proved to be the most promising experimental host for *Dirofilaria imformis*.

S. Willmott

**2269**—TAYLOR, A. E. R., 1960. "Observations with the Ultropak microscope on microfilariae of *Litomosoides carinii* circulating in the liver of a cotton-rat, before and after the administration of hetrazan." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **54** (5), 450–453.

The movements of microfilariae in the surface capillaries of anaesthetized cotton-rats infected with *Litomosoides carinii* were studied by means of annular oblique incident illumination. In fine capillaries, the microfilariae appeared as white snake-like structures which, when caught in bends of the capillaries, could move against the flow of blood; in larger vessels, the microfilariae had a straight rod-like structure that offered little resistance to the blood flow. Five minutes after the intravenous injection of diethylcarbamazine (50 mg. per kg. body-weight in 0.2 ml. of saline) most microfilariae were attached, usually by their tails, to the capillary walls. The microfilariae frequently wriggled actively but they remained attached to the walls for up to one hour after the administration of the drug. Occasionally one or two leucocytes were seen attached to the tail of a stationary microfilaria and Taylor suggests that phagocytosis occurs after the embryos become attached to the capillary walls.

P. Williams

- 2270—VILAR-ALVAREZ, C. M. & GOODCHILD, C. G., 1961. [Department of Zoology, University of Miami, Coral Gables, Florida, U.S.A.] "*Hymenolepis diminuta* in surgically altered hosts. I. Attempts to cultivate cestodes in isolated sections of the small intestine: observations on changes in the isolated and rejoined intestines." *Journal of Parasitology*, **47** (1), 53–60.

Vilar-Alvarez & Goodchild isolated various regions of the small intestine of rats which retained their normal blood supply but were devoid of exogenous food; the remaining small intestine was rejoined to form a functional gut. In some isolated sections of intestine the flow of bile was prevented but in others normal flow of bile was allowed via the bile-duct or through a cannula. Adult *Hymenolepis diminuta*, obtained from donor rats 14 days after their infection, did not survive when transplanted into any isolated section of intestine. Where bile was absent the worms soon became embedded in mucus; where bile was present the mucus mass did not form but the worms died soon after transplantation and underwent histolysis. Isolated sections of intestine decreased in length and diameter whereas the rejoined intestine elongated and increased in diameter, especially when bile was absent. J. W. Smith

- 2271—WADE, A. E., FOX, L. E. & SWANSON, L. E., 1960. [School of Pharmacy, University of Georgia, Athens, Georgia, U.S.A.] "Studies on infection and immunity with the cattle lungworm, *Dictyocaulus viviparus* (Bloch). I. Infection in laboratory animals." *American Journal of Veterinary Research*, **21** (84), 753–757.

Mice, rats, hamsters, guinea-pigs, rabbits and goats were experimentally infected with *Dictyocaulus viviparus* and of these, on the criterion of size attained by larvae in the lungs, the goat and the guinea-pig were the most satisfactory hosts, the guinea-pig being the most susceptible. The worms did not mature in any of the animals. In guinea-pigs changes in the blood picture, anorexia, weight loss and occasional death were noted as well as complement-fixing antibody 30 to 45 days post-infection but not 129 days post-infection. An elevation of  $\gamma$ -globulin in sera of infected guinea-pigs was noted by the 30th day after infection.

W. M. Fitzsimmons

- 2272—WEINMANN, C. J., 1960. "Studies on schistosomiasis. XV. Resistance to *Schistosoma mansoni* in mice immunized with *Trichinella spiralis*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 37.

Mice previously infected with *Trichinella spiralis* were exposed to cercariae of *Schistosoma mansoni*. The mean number of schistosomes recovered from these mice was 17.0 and 16.8% of these were immature. Control mice showed a mean schistosome burden of 13.6 with 12.6% immature worms. It is concluded that the debilitating effect of the *T. spiralis* infection may have rendered the mice more susceptible to *S. mansoni*. S. Willmott

- 2273—WEINMANN, C. J. & HUNTER, III, G. W., 1960. [Department of Microbiology, College of Medicine, University of Florida, Gainesville, Florida, U.S.A.] "Studies on schistosomiasis. XIV. Effects of cortisone upon the *Schistosoma mansoni* burden in mice." *Experimental Parasitology*, **New York**, **9** (3), 239–242.

Weinmann & Hunter performed experiments to determine the stage of infection at which cortisone might exert an effect in altering the burden of *Schistosoma mansoni* in the tissues of the host. Swiss albino mice varying from seven to 13 weeks old were infected with a Puerto Rican strain of *S. mansoni* maintained in laboratory-reared *Australorbis glabratus*. All the cortisone-treated mice consistently harboured fewer worms at autopsy than did the respective controls. Alterations in the sex ratio also occurred resulting in a decrease in the number of female worms. These changes were more marked in younger hosts which received more cortisone per unit of body-weight than older mice. These changes were produced when the hormone was administered until shortly before exposure to cercariae or commencing on the 15th day after infection, but no significant differences were recorded when treatment with cortisone commenced four to five weeks after infection. D. L. H. Robinson

- 2274—WOOD, I. B. & HANSEN, M. F., 1960. [Parasitic Chemotherapy Section, Agricultural Division, American Cyanamid Co., Pearl River, New York, U.S.A.] "Experimental transmission of ruminant nematodes of the genera *Cooperia*, *Ostertagia*, and *Haemonchus* to laboratory rabbits." *Journal of Parasitology*, **46** (6), 775–776.

Wood & Hansen summarize briefly the work on transmission of species of *Cooperia*, *Ostertagia* and *Haemonchus* to small laboratory animals. Using six to ten-week-old New Zealand White



rabbits to study infections with *Trichostrongylus colubriformis* they found concurrent infections with *C. curticei* and *O. circumcincta*. They attempted to infect other rabbits with *C. curticei* and found that a small proportion of each inoculum became established. They report a pre-patent period of 18 days and a patent period of more than 68 days. Further tests using *C. punctata* resulted in the establishment of small infections with this species. Investigation of a second generation of *C. punctata* in rabbits suggested that the infectivity was doubled after one generation passage. Attempts to establish *Haemonchus contortus* in rabbits were unsuccessful except in an experiment using artificially exsheathed larvae; even in this case only 13 worms were recovered after an inoculum of 100,000 larvae.

H. D. Crofton

- 2275**—WORLEY, D. E., MEISENHOLDER, J. E., SHEFFIELD, H. G. & THOMPSON, P. E., 1960. "Laboratory studies of the rodent whipworm, *Trichuris muris* (Schrank, 1788)." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 38.

Studies on the infectivity of *Trichuris muris* to white mice, DBA-2 hybrid mice, wild housemice, deer mice, white rats and golden hamsters showed that only the first two were susceptible. Highest infection rates were obtained with young DBA-2 mice, infections in white mice being erratic. Adult mice were more resistant. Attempts to increase infectivity by decoating eggs and other means were unsuccessful. The pre-patent period was about five weeks; spontaneous loss of infection in a high proportion of mice was observed after about 60 days.

S. Willmott

- 2276**—ZAIMAN, H., HECHT, H. S. & HOWARD, R. G., 1960. [Department of Pathology, Albert Einstein College of Medicine, Yeshiva University, Bronx, New York, U.S.A.] "Mortality of young male mice infected with 6,400 normal or irradiated *Trichinella spiralis* larvae." *Experimental Parasitology*, **New York**, **10** (3), 284–286.

Zaiman *et al.* infected mice with 6,400 *Trichinella spiralis* larvae which were either normal or which had been irradiated with 8,000 r., 10,000 r. or 12,000 r. All mice which received the non-irradiated larvae died after about 74 hours; no encysted larvae were recovered from the musculature. Approximately 85% of those infected with larvae irradiated with 8,000 r. or 10,000 r. died after 107 to 117 hours; encysted larvae were recovered from the musculature. None died of those infected with larvae irradiated with 12,000 r.; encysted larvae were not recovered from the musculature; in these mice an initial weight loss was regained. The authors suggest that doses larger than 6,400 larvae irradiated with 12,000 r. may prove fatal.

J. W. Smith

## Poultry

- 2277**—BELOKOBILENKO, V. T., 1960. [Helminth fauna of chickens in the Alma-Ata region.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, **12**, 173–182. [In Russian.]

Of 549 chickens examined post-mortem in the Alma-Ata region, 94.7% had helminths. The incidence of nematodes was 90.7% and that of cestodes 46.3%. *Sobolevicanthus gracilis* is recorded for the first time from chickens. Altogether six nematode and six cestode species were found and out of desert-steppe, sub-alpine, meadow-forest-steppe and dry steppe zones, the last two were the most infected.

N. Jones

- 2278**—DIXON, C. F., 1961. [Kansas State University, U.S.A.] "Helminth parasites of chickens and turkeys in eastern Kansas." *Dissertation Abstracts*, **21** (8), 2410.

- 2279**—LUND, E. E., 1960. "Factors influencing the survival of *Heterakis* and *Histomonas* on soil." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 38.

Susceptible turkey poults were put on to test plots, naturally contaminated with *Heterakis* and *Histomonas*, at six-monthly intervals for five years to determine the length of infectivity. *Heterakis* infections acquired declined 89% in the first five months (summer) and 8% in the following seven months. At the end of the second summer the average infection acquired was 0.8% of that at the beginning of the experiment and subsequently 75% to 96% of the birds acquired no worms.

S. Willmott

\*2280—PARUKHIN, A. M., 1957. [Experimental investigation of the development of *Drepanidotaenia* infection in geese.] *Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut*, 19, 79–91. [In Russian.]

2281—PODHORSKÝ, J., 1957. "Příspevek k problematice kapillariosy hrabavé drůbeže." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 30 (2), 105–134. [English, German & Russian summaries pp. 133–134.]

*Capillaria* infections, with and without concomitant *Ascaridia* and cestode infections were diagnosed by autopsy and/or faecal examinations of domestic fowl at numerous farms. Of the treatments tested anise oil (1 : 5 with paraffin, one drop daily for five successive days) had the best effect against capillariasis, rendering the faeces negative and having no side effects. Copper sulphate (1% in drinking water from 14 days old to five months) stopped mortality among the birds. Benzine, tetrachlorethylene, carbon tetrachloride, phenothiazine and flowers of sulphur were not so reliable. In many cases the introduction of prophylactic measures based on management and better feeding improved the general condition of the birds.

N. Jones

2282—SAVCHENKO, M. E., 1960. [Kafedra zoologii, Krivorozhski pedagogicheski institut, U.S.S.R.] [A contribution to the study of the helminth fauna of domestic fowls in Krivoy Rog.] *Zoologicheski Zhurnal*, 39 (7), 1091. [In Russian: English summary p. 1091.]

The following helminths were identified on examination of 360 chickens from three collective farms in the Krivoy Rog district of Dnepropetrovsk: *Prosthogonimus ovatus* in four, *Davainea proglottina* and *Raillietina echinobothrida* in 30, *Heterakis gallinae* in 85%, *Ascaridia galli* in 32% and *Capillaria columbae* in 6.5%.

G. I. Pozniak

2283—WILLOMITZER, J. & GILKA, F., 1957. [Státní vědecký veterinární ústav, Prague, Czechoslovakia.] "Příspevek k výskytu hlístice *Tetrameres fissispina* u kachen." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 30 (11), 825–828. [English & Russian summaries p. 828.]

Willomitzer & Gilka report finding *Tetrameres fissispina* in ducks and describe the parasite and the pathological changes caused in the proventriculus.

N. Jones

### Other Mammals

2284—ALLEN, R. W. & SAMSON, K. S., 1960. [Animal Disease and Parasite Research Division, Agricultural Research Service, U.S. Department of Agriculture, University Park, New Mexico, U.S.A.] "Further observations on *Thysanosoma actinioides* in the American pronghorn." *Journal of Parasitology*, 46 (5), 671.

The fact that pronghorns (*Antilocapra americana*), killed on a sheep ranch in New Mexico, were heavily infected with *Thysanosoma actinioides* (described originally from *Cervus dichotomus*) suggests that the original definitive host in North America was also a wild ruminant.

N. Jones

2285—BABERO, B. B., 1960. "A survey of parasitism in skunks (*Mephitis mephitis*) in Louisiana, with observations on pathological damages due to helminthiasis." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 26–27.

Eleven species of nematodes, three of trematodes, three of cestodes and three of acanthocephalans are recorded from 126 mature *Mephitis mephitis* in Louisiana. Of these *Filaroides martis*, *Gnathostoma* sp., *Molineus patens* and *Physaloptera maxillaris* were shown to be highly pathogenic.

S. Willmott

2286—BRUCE, J. I., LLEWELLYN, L. M. & SADUN, E. H., 1960. "Susceptibility of wild mammals to experimental infection with *Schistosoma mansoni*." *Journal of Parasitology*, 46 (5, Sect. 2), 33.

67 wild mammals representing 15 species were tested for susceptibility to *Schistosoma mansoni*. Woodchuck, squirrel, white-footed mouse, meadow vole and opossum permitted normal development of adults which produced eggs giving rise to miracidia which were infective



to snails. House rat, cottontail rabbit, raccoon, chipmunk, jumping mouse and nutria harboured nearly mature worms but no fertile eggs were produced. Fox and chipmunk were both resistant, no adults being recovered. S. Willmott

**2287**—CHUTE, R. M., 1960. [San Fernando Valley State College, Northridge, California, U.S.A.] "Overwintering of helminths in hibernating animals." *Journal of Parasitology*, **46** (5), 539.

Viable nematodes, which appeared to be adult, were recovered from seven out of 13 *Marmota monax*, shot in central Vermont in late April. It is suggested that the parasites survived the winter in the hibernating animals. N. Jones

**2288**—CHUTE, R. M., 1960. "The development of *Trichinella spiralis* in the dormouse, *Eliomys quercinus*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 21.

Eight adult dormice were each infected with 550 *Trichinella* larvae; six-week-old white rats were similarly infected. On the fifth day after exposure 23 adult *T. spiralis* were recovered from the intestine of one dormouse; the females contained ova but no vermiform embryos were observed. On the 20th day four adult females with vermiform embryos were recovered and twelve uncoiled larvae were found in the diaphragm of a dormouse. On the 31st day the average number of larvae recovered from six dormice was 1,920, compared with an average of 38,950 from the six rats, and no adults were found in rats or dormice. S. Willmott

**2289**—CHUTE, R. M., 1960. "The influence of hibernation on the development of *Trichinella spiralis* in the dormouse, *Eliomys quercinus*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 21–22.

In experiments with 18 adult dormice, each infected with 550 *Trichinella* larvae, Chute has shown that there is no evident relation between individual worm recoveries and length of hibernation in two groups exposed to cold (6°C.). S. Willmott

**2290**—CHUTE, R. M. & COVALT, D. B., 1960. [Department of Biology, San Fernando Valley State College, Northridge, California, U.S.A.] "The effect of body temperature on the development of *Trichinella spiralis* in bats." *Journal of Parasitology*, **46** (6), 855–858.

*Myotis lucifugus*, *Pipistrellus subflavus* and *M. keenii* were given from 100 to 575 *Trichinella spiralis* larvae each. 24 of these bats, some of which were roused every few days, were kept at 5°C., six at 23°C., 28 at 26°C., 24 at 30°C. and 22 at 34°C. Larvae were recovered from the intestines of all the bats; only two larvae were obtained from the muscles of one animal kept at 34°C. for 30 days. Adult *Trichinella* were found in all those bats kept at 30°C. and 34°C. and two were recovered from two *M. lucifugus* which had been kept at 5°C.; the latter observation is of especial interest. It is concluded that the lowered host temperature had an inhibitory effect on the parasite and that this may be greater in uninterrupted moderate temperatures than in interrupted exposure to much lower temperatures. N. Jones

**2291**—DISSANAIKE, A. S. & PARAMANANTHAN, D. C., 1960. [Department of Parasitology, Faculty of Medicine, University of Ceylon, Colombo, Ceylon.] "On the occurrence of *Echinococcus granulosus* (Batsch, 1786) in a Ceylon jackal." *Ceylon Veterinary Journal*, **8** (3/4), 82–87.

Dissanaike & Paramanathan found seven *Echinococcus granulosus* in the small intestine of a jackal from Ceylon. The size and number of hooks on the scoleces of the present specimens are compared with those from dogs and from brood capsules obtained from cattle. *E. granulosus* is compared in tabulated form with *E. multilocularis*. Three of 35 dogs examined in Colombo were infected with *E. granulosus*. The authors suggest that there is a sylvatic cycle of hydatidosis in the jungle; further surveys may show a relationship between this cycle and human hydatidosis. J. W. Smith

**2292**—DISSANAIKE, A. S. & PARAMANANTHAN, D. C., 1961. [Department of Parasitology, University of Colombo, Ceylon.] "*Brugia*-type adults and microfilariae in a Ceylon hare." [Correspondence.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **55** (3), 299.

The occurrence of sheathed microfilariae of the *Brugia* type in the blood, and of adults in the heart and hepatic vessels, of a specimen of *Lepus nigricollis sinhala* in Ceylon is reported for the first time. R. T. Leiper

**2293**—GRUNDMANN, A. W. & FRANDSEN, J. C., 1960. [Department of Zoology and Entomology, University of Utah, Salt Lake City, Utah, U.S.A.] "Definitive host relationships of the helminth parasites of the deer mouse, *Peromyscus maniculatus*, in the Bonneville Basin of Utah." **Journal of Parasitology**, **46** (6), 673–677.

Parasitological examinations of *Peromyscus maniculatus sonoriensis* and *P. m. rufinus* in the Bonneville Basin of Utah revealed the presence of *Brachylaime microti*, five species of cestodes (three in larval stages), six species of nematodes and *Moniliformis clarki*. Nine of these parasites were observed among 19 other rodent species. From this and from the universal distribution of *P. maniculatus* it is concluded that this rodent is responsible for distributing and maintaining the infection with non-host-specific parasites amongst other rodents in different habitats.

N. Jones

**2294**—KAPITONOV, V. I., 1960. [Nauchno-issledovatel'skiy institut sel'skogo Khozyaystva Krainego Severa, Leningrad, U.S.S.R.] [Parasites of *Marmota camtschatica* Pall.] **Zoologicheskii Zhurnal**, **39** (9), 1435–1437. [In Russian: English summary p. 1437.]

The parasites found on examination of 116 *Marmota camtschatica* included the nematode *Citellina triradiata* which, in July, infected 100% of adults.

G. I. Pozniak

**2295**—LAYNE, J. N. & GRIFFO, Jr., J. V., 1961. [Department of Biology, University of Florida, Gainesville, Florida, U.S.A.] "Incidence of *Capillaria hepatica* in populations of the Florida deer mouse, *Peromyscus floridanus*." **Journal of Parasitology**, **47** (1), 31–37.

In connection with a study of the life-history and ecology of *Peromyscus floridanus*, data were obtained on the incidence of *Capillaria hepatica* in populations in different habitats. *C. hepatica* is recorded in this host for the first time.

R. T. Leiper

**\*2296**—MOROZOV, F. N., 1957. [The helminth fauna of moles in the Gorki area.] **Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut**, **19**, 27–29. [In Russian.]

**\*2297**—MOROZOV, F. N., 1957. [Parasitic worms from *Enhydra lutris*.] **Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut**, **19**, 31–33. [In Russian.]

**2298**—NEAL, B. J., 1960. [Division of Natural Resources, Humboldt State College, Arcata, California, U.S.A.] "Two parasites from coati in southern Arizona." **Journal of Parasitology**, **46** (5), 647. Neal reports *Nasua narica* as a new host of *Physaloptera rara* in the Huachuca Mountains.

N. Jones

**2299**—OLSEN, O. W., 1960. "Sylvatic trichinosis in carnivorous mammals in the Rocky Mountain region of Colorado." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 22.

In a survey of the incidence of *Trichinella* in eight species of predatory mammals, Olsen found the following infected: four of 394 *Lynx rufus*, one of 193 *Canis latrans* and one of 33 foxes (probably *Vulpes fulva*). None of 11 *Mephitis mephitis*, six *Felis concolor*, five *Taxidea taxus*, two *Procyon lotor* and one *Ursus americanus* were infected.

S. Willmott

**2300**—ROMANOV, I. V., 1960. [Gorkovski meditsinskiy institut, U.S.S.R.] [The helminth fauna of sables and other Mustelidae in the Krasnoyarsk Territory.] **Zoologicheskii Zhurnal**, **39** (7), 995–1002. [In Russian: English summary p. 1002.]

Three species of cestodes, 16 of nematodes and one of acanthocephalans were found on examination of 347 Mustelidae. These included 305 sables of which 82.2% were infected and the most frequent helminths were *Capillaria putorii*, *Filaroides martis*, *Sobolevingylus petrovi*, *Taenia skrjabini* and *Grenosoma petrovi*; an interesting find was three dilepidid cysticercoids in the liver of one of the sables. Descriptions are given for *C. petrovi* and *Agamospirura* sp. I (two variations) from sables, *Agamospirura* sp. II from sables and *Mustela sibirica*, and *Filaria* sp. from sables (a new host record) which differs from *F. martis* in that the vulva opens below the oesophagus. Males of *Sobolevingylinae* (generically and specifically unplaced) are described from two sables and one *Lutreola vison*; they differ from *S. petrovi* chiefly in the presence of a gubernaculum.

G. I. Pozniak



- \*2301—SHALDIBIN, L. S., 1957. [Data on the epizootiology of some helminths of elk.] **Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut**, 19, 57–63. [In Russian.]
- \*2302—SHALDIBIN, L. S., 1957. [Parasitic worms of wolves in the Mordov A.S.S.R.] **Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut**, 19, 65–70. [In Russian.]
- 2303—STAM, A. B., 1960. [Laboratoire médical, Stanleyville, Congo.] “Un cas mortel d’ascaridiose (*Ascaris lumbricoides* L.) chez le chimpanzé nain (*Pan paniscus* Schwarz).” **Annales de Parasitologie Humaine et Comparée**, 35 (4), 675.
- A specimen of *Pan paniscus* died 19 days after the last dose of Alcopar which had caused eliminations of *Ascaris lumbricoides*. At autopsy 46 specimens of this parasite were recovered as well as some *Necator americanus*. N. Jones
- \*2304—TRINKLER, O. K., 1957. [Helminths of *Rattus norvegicus* Berk and *Mus musculus* L. in the Gorki area.] **Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut**, 19, 73–77. [In Russian.]
- 2305—ZADURA, J., 1960. [Instytut Weterynarii, Puławy, Poland.] “*Paramphistomum cervi* (Schränk, 1790) as the cause of a serious disease in stags (*Cervus elaphus* L.).” **Acta Parasitologica Polonica**, 8 (21/32), 345–350. [Polish summary pp. 349–350.]
- Zadura reports on the post-mortem examination of two *Cervus elaphus* which had died as a result of a massive infection of *Paramphistomum cervi*. The occurrence of the larval trematode under the mucous membrane of the rumen is interesting and may throw light on the hitherto unsolved problem of the course of development of this parasite. Three photomicrographs illustrate the parasite *in situ*. J. W. Smith

### Other Birds

- 2306—DORNEY, R. S. & TODD, A. C., 1960. [Department of Veterinary Science, University of Wisconsin, Madison, Wisconsin, U.S.A.] “Spring incidence of ruffed grouse blood parasites.” **Journal of Parasitology**, 46 (6), 687–694.
- This paper is mainly concerned with seasonal incidence of blood protozoa in *Bonasa umbellus* in North America, but mention is made that microfilariae are commonest in peripheral blood smears in spring—the breeding season—thus providing an epizootiological link between adults and newly hatched chicks. W. M. Fitzsimmons
- 2307—ELLIS, C. J., 1961. [Department of Science, Iowa State Teachers College, Cedar Falls, Iowa, U.S.A.] “*Microtetrameres* in the bronzed grackle and the eastern meadowlark.” **Journal of Parasitology**, 47 (1), 37.
- One female *Microtetrameres* sp. was found in the visceral washings of one of 13 *Quiscalus versicolor* and two females of the same genus in the proventriculus of one of three *Sturnella magna* collected from Chicasaw County, Iowa. Ellis states that these are apparently new host records. J. W. Smith
- 2308—LUFT, K., 1960. [Katedra Parazytologii, Wyższa Szkoła Rolnicza, Lublin, Akademicka 11, Poland.] “The helminths of jay (*Garrulus glandarius* L.) and magpie (*Pica pica* L.) from Lublin Palatinate.” **Acta Parasitologica Polonica**, 8 (21/32), 351–356. [Polish summary p. 356.]
- Luft found eight species of helminths in 34 of 62 *Pica pica* and 15 of 46 *Garrulus glandarius* from Lublin. *Acuaria anthuris*, *Capillaria corvorum*, *Hymenolepis stylosa*, *Porrocaecum ensicaudatum* and *Syngamus trachea* were found in *Pica pica*. *A. anthuris*, *C. corvorum*, *Dispharynx laplantei*, *H. serpentulus*, *Lyperosomum longicauda* and *Porrocaecum ensicaudatum* were found in *G. glandarius*. *D. laplantei*, *H. stylosa* and *L. longicauda* are new for Poland; *L. longicauda* in *G. glandarius* is a new host record. J. W. Smith

**2309**—McKEEVER, S., 1961. [Department of Zoology, University of California, Davis, California, U.S.A.] "The occurrence of *Rhopalias macracanthus* (Trematoda: Rhopaliasidae) in the wild turkey (*Meleagris gallopavo*)."  
**Journal of Parasitology**, **47** (1), 60.

McKeever recovered one *Rhopalias macracanthus* containing mature eggs from the intestine of a wild turkey (*Meleagris gallopavo*) from the neighbourhood of Pretoria, Georgia. This specimen was smaller than those originally described by Chandler from *Didelphis virginiana*; the caeca were visible throughout their length and extended to within 0.187 mm. of the posterior end of the body.  
J. W. Smith

**2310**—PANDE, B. P., AHLUWALIA, S. S. & SRIVASTAVA, J. S., 1960. [Department of Parasitology, U.P. College of Veterinary Science & Animal Husbandry, Mathura, India.] "Note on host-parasite relationships observed in fluke infections of wild aquatic birds."  
**Parasitology**, **50** (3/4), 323-327.

Pande *et al.* describe and figure five immature *Cathaemasia* sp. from the oesophagus and proventriculus of both *Xenorhynchus asiaticus* and *Ibis laucocephalus*. Cathaemasids are found within enlarged glands of the proventriculus, affected glands showing pressure atrophy with cystically dilated acini due to the sucking action of the powerful acetabulum. *Echinochasmus* sp. adults, recovered in large numbers from the small intestine of *I. laucocephalus*, are described and figured. Nodules, which protrude from the intestinal wall, contain up to five flukes, the posterior ends of which hang freely in the intestinal lumen. The flukes make tunnels in the submucosal and muscular coats of the intestine so inducing necrotic changes in the surrounding tissues.  
J. W. Smith

**2311**—PANIN, V. Y., 1960. [The helminth fauna of birds of the Zaysan valley.] **Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR**, **12**, 166-172. [In Russian.]

Out of 156 wild birds from the Zaysan valley, helminths were found in 57. 14 trematode, 13 cestode, seven nematode and three acanthocephalan species are recorded. The following new host records were established: *Lanius cristatus* for *Plagiorchis multiglandularis* and *Anomotaenia constricta*, *Charadrius dubius* for *P. laticola* and *Echinoparyphium recurvatum*, *Egretta alba* and *Passer domesticus* for *Episthmium bursicola*, *Sterna hirundo* for *Cotylurus cornutus* and *Trichobilharzia ocellata*, *Larus ridibundus* for *Dicranotaenia coronula*, *Limosa limosa* for *Limnolepis amphitricha*, *Charadrius alexandrinus* for *Aploparaksis filum*, *Motacilla flava* for *Anomotaenia trigonocephala*, *Colymbus cristatus* for *Syncuaria decorata*, and *Pastor roseus* for *Capillaria corvorum* and *Prosthorrhynchus transversus*. Out of the 37 species 18 were recorded in Kazakhstan for the first time.  
N. Jones

**2312**—RUSSELL, Jr., H. T., 1960. "Trematodes from shorebirds collected at Morro Bay, California." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 15.

Three species of Philophthalmidae, five of Echinostomatidae, seven of Microphallidae, two of Gymnophallinae, two of Galactosomatidae, one of Notocotylidae, two of Eucotylidae, one of Rencolinidae, two of Cyclocoelidae and at least one of Schistosomatidae were recovered from eight species of shore birds at Morro Bay. Some of these trematodes are apparently new to science [but no specific or generic identifications are made in this author's abstract]. Host and host sex specificity varied. October collections had more juvenile than adult worms and February collections more adults than juveniles. The evidence indicated that the infections were acquired locally.  
S. Willmott

**2313**—SULGOSTOWSKA, T., 1960. [Katedra Zoologii, S.G.G.W., Warszawa, Rakowiecka 8, Poland.] "Extra-intestinal trematodes in birds of the mesotrophic lakes: Gołdapiwo and Mamry Północne."  
**Acta Parasitologica Polonica**, **8** (21/32), 471-492. [Polish summary p. 492.]

This is a continuation of an earlier paper by Sulgostowska on the intestinal trematodes in birds from the two mesotrophic lakes Gołdapiwo and Mamry Północne [for abstract see Helm. Abs., **30**, No. 115]. 652 birds belonging to 11 families and 47 species were examined and of these 180 were infected with 19 species of non-intestinal trematodes belonging to the families Cyclocoelidae, Dicrocoeliidae, Echinostomatidae, Eucotylidae, Opisthorchiidae, Rencolidae and Schistosomatidae. Tabulated data give the number of birds examined, the percentage



infected, the frequency of parasites on the two lakes and the trematode families occurring in each bird species. New host records are as follows: *Cyclocoelum mutabile* in *Anas strepera*, *Eucotyle zacharovi* in *Aythya ferina* and *A. marila*, *E. wehri* and *Dendritobilharzia pulverulenta* in *A. fuligula*. The following are reported as new for Poland: *Hyptiasmus oculus*, *Platynosomum semifuscum*, *E. cohnii*, *E. wehri*, *Tanaisia atra*, *Renicola pinguis*, *Opisthorchis longissimus* and *Gigantobilharzia monocotylea*. On the basis of a comparison of the measurements and drawings given by Strom with those of the present material, Sulgostowska makes *T. longivitellata* a synonym of *T. atra*. *O. (=Notaulus) asiaticus* is made a synonym of *O. longissimus*; any morphological differences between specimens of this parasite are considered by Sulgostowska to be due to host modifications.

J. W. Smith

**2314**—ULMER, M. J., 1960. "Passeriform birds as experimental hosts of *Posthodiplostomum minimum* (Trematoda: Diplostomatidae)." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 18. *Turdus migratorius* has been shown to be a suitable experimental definitive host for *Posthodiplostomum minimum*, normally parasitic in the Ardeidae. In *Agelaius phoeniceus* and *Xanthocephalus xanthocephalus* metacercariae did not develop to sexual maturity. Gravid worms from *T. migratorius* were identical with those from naturally infected herons.

S. Willmott

**2315**—WELLS, M. J. & HUNTER, W. S., 1960. [Department of Zoology, Duke University, Durham, North Carolina, U.S.A.] "Helminths of the yellowthroat, *Geothlypis trichas* during migration." *Journal of Parasitology*, **46** (5), 623.

Twelve helminth species were found in 20 of 40 migrating yellowthroats, *Geothlypis trichas*, collected near Durham (U.S.A.). This is a new host record for the following: *Brachylecithum americanum*, *Zonorchis alveyi*, *Apororhynchus amphistomi*, *Mediorhynchus robustus*, *Oxyspirura petrowi*, *O. pusillae* and *Ornithofilaria inornata*.

N. Jones

## Reptiles and Amphibians

**2316**—FRANDSEN, J. C. & GRUNDMANN, A. W., 1960. [Department of Zoology & Entomology, University of Utah, Salt Lake City, Utah, U.S.A.] "The parasites of some amphibians of Utah." *Journal of Parasitology*, **46** (6), 678.

The following helminths were collected from a large number of locations ranging from the lowlands adjacent to Great Salt Lake to lakes in the Wasatch Mountains in Utah: *Halipegus* sp., *Haematoloechus coloradensis* and *Alaria* sp. (mesocercariae) from *Rana pipiens*; *Phyllodistomum bufonis*, *Cosmocercoides dukae* and *Oxysomatium giganticum* from *Bufo boreas*; *H. coloradensis* and *Alaria* sp. (mesocercariae) from *B. woodhousii*; *Ophiotanea filaroides* (adults and plerocercoids) and *Spironoura elongata* from *Ambystoma tigrinum*.

R. T. Leiper

**2317**—GOLIKOVA, M. N., 1960. [Kafedra zoologii bezpozvonochnikh, Leningradski gosudarstvenni universitet, U.S.S.R.] [Ecological and parasitological study of the biocoenoses of some lakes of the Kaliningrad region. Part I. The parasite fauna of Anura.] *Zoologicheski Zhurnal*, **39** (7), 984-994. [In Russian: English summary p. 994.]

Of 110 amphibians (*Rana temporaria*, *R. esculenta*, *R. terrestris*, *Bombina bombina*, *Bufo bufo* and *Pelobates fuscus*) examined from two lakes in the Kaliningrad region, 50% were infected with trematodes and 71% with nematodes. The fauna, which comprises 18 trematode, eight nematode and one acanthocephalan species, is listed and is discussed under individual hosts.

G. I. Pozniak

**2318**—JUDD, W. W., 1960. [Department of Zoology, University of Western Ontario, London, Ontario, Canada.] "Observations on the habitat, food, reproductive state and intestinal parasites of the smooth green snake at London, Ontario." *Canadian Field-Naturalist*, **74** (2), 100-106.

Judd examined 19 *Opheodrys vernalis vernalis* collected from London, Ontario and found 13 infected with *Ochhoristica (?natricis)*, four infected with one larva each of *Physaloptera* sp. and one snake infected with one male *Aplectana* sp.

J. W. Smith

- 2319—McCAULEY, J. E. & PRATT, I., 1959. [Department of Zoology, Oregon State College, Corvallis, Oregon, U.S.A.] "The paramphistome *Megalodiscus microphagus* Ingles, 1936, from the giant salamander *Dicamptodon ensatus* (Eschscholtz, 1833) from Oregon." **Journal of Parasitology**, **45** (6), 614.

Seven specimens of *Megalodiscus microphagus* (which has not been reported since Ingles named and described it in 1936 from *Bufo boreas*) were collected from the rectum of a larval *Dicamptodon ensatus*.  
R. T. Leiper

- 2320—WAITZ, J. A., 1961. [Department of Zoology, University of Illinois, Urbana, Illinois, U.S.A.] "Parasites of Idaho reptiles." **Journal of Parasitology**, **47** (1), 51.

Waitz gives a list of two trematode, six cestode and four nematode species collected by him from 57 reptiles (representing 15 species) in Idaho.  
N. Jones

- 2321—WAITZ, J. A., 1961. [Department of Zoology, University of Illinois, Urbana, Illinois, U.S.A.] "Parasites of Idaho amphibians." **Journal of Parasitology**, **47** (1), 89.

Eight species of trematodes, three species of nematodes and a *Baerietta* sp. were recovered from 167 Idaho amphibians belonging to 14 species.  
N. Jones

### Miscellaneous

- \*2322—BOEV, S. N. & IVERSINA, E. M., 1957. [The distribution and dynamics of fascioliasis of small and large domestic ruminants in Kazakhstan.] **Trudi Kazanskogo Nauchno-Issledovatel'skogo Veterinarnogo Instituta**, **9**, 485–494. [In Russian.]

- 2323—BREZA, M., 1958. [Katedra parazitologie a invaznych chrôb, Vet. fakulta, Košice, Czechoslovakia.] "Úloha ostatných domácich a voľne žijúcich zvierat pri udržiavaní zdrojov fasciolózy v prírode." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, **31** (12), 957–962. [English, German & Russian summaries pp. 961–962.]

Breza, after reviewing some previous work, including that of Ryšavý [for abstract see Helm. Abs., **22**, No. 960d], concludes that the maintenance of fascioliasis among sheep and cattle is due more to its high incidence amongst these animals than to wild animals acting as reservoir hosts.  
N. Jones

- 2324—ERSHOV, V. S., 1960. [The problem of immunization of farm animals against helminthiasis.] **Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR**, **12**, 96–103. [In Russian.]

Ershov reviews the problem of immunization of farm animals; he concludes that, at present, chemotherapy is more reliable and effective against some of the more important helminthiasis than is active immunization.  
N. Jones

- 2325—HOVORKA, J., 1958. [Helmintologický ústav SAV, Košice, Czechoslovakia.] "Priebeh históriou štúdia a epizootii fasciolózy domácich zvierat." [A brief outline of the history of investigation and epizootics of fascioliasis in domestic animals.] **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, **31** (12), 909–916. [English, German & Russian summaries pp. 915–916.]

- 2326—HUTCHISON, W. F., 1960. [Department of Preventive Medicine, University of Mississippi, School of Medicine, Jackson, Mississippi, U.S.A.] "Studies on the hydatid worm, *Echinococcus granulosus*. II. Prevalence in Mississippi." **American Journal of Tropical Medicine and Hygiene**, **9** (6), 612–615.

Several autochthonous cases of human echinococcosis have been reported in Mississippi. Hutchison examined 33,174 native Mississippi pigs and found 306 (0.9%) infected with hydatid cysts. Since 1953, six dogs in Mississippi have been found infected with adult tapeworms. Twenty raccoons (*Procyon lotor*), 13 bobcats (*Lynx rufus*), nine red foxes (*Vulpes fulva*) and five opossums (*Didelphis virginiana*) were examined for adult *Echinococcus*; all were negative.

G. A. Webster



**2327**—LAVROV, L. I., 1960. [The fauna and dynamics of intestinal cestodes of domestic ruminants in northern Kazakhstan.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, 12, 150-165. [In Russian.]

Autopsies of 2,598 sheep and 3,901 cattle in northern Kazakhstan showed the presence of *Thysaniezia giardi*, *Moniezia benedeni* and *M. expansa*, with a total incidence of 15% in sheep and 6.5% in cattle. In sheep, the incidence of infection diminished with age. This was also true for the degree of infection, but not for the incidence, in cattle. In cattle, *M. expansa* was observed only among young animals. The highest degree of infection was observed in sheep in the summer and in cattle in the autumn. N. Jones

**2328**—MALEK, E. A., ASH, L. R., LEE, H. F. & LITTLE, M. D., 1960. "Schistosomiasis in Louisiana mammals." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 34.

*Heterobilharzia americana* is recorded from 25 of 36 raccoons, 16 of 22 nutria and in three dogs at Pass a Loutre (Mississippi River delta). Deaths attributed to this parasite occurred in one dog and three caged raccoons. Pathological findings are described. S. Willmott

**2329**—PODHÁJECKÝ, K., 1958. [Helmintologický ústav SAV, Košice, Czechoslovakia.] "Množstvo fasciolami znehodnotených hovadských a ovčích pečení v jatočnictve na Slovensku v rokoch 1954 a 1955." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 31 (12), 917-924. [English, German & Russian summaries pp. 923-924.]

According to statistics from district abattoirs in Slovakia, fascioliasis caused 23.1% of cattle and 35.8% of sheep livers to be condemned during the period of 1954-55. N. Jones

**2330**—ROBINSON, H. A. & OLSEN, O. W., 1960. [Otero Junior College, La Junta, Colorado, U.S.A.] "The role of rats and mice in the transmission of the porkworm, *Trichinella spiralis* (Owens, 1835) Railliet, 1895." *Journal of Parasitology*, 46 (5), 589-597.

Opinions differ as to the role which faeces of animals which have consumed trichinous meat play in the spread of trichinellosis to man. After summarizing previous publications Robinson & Olsen report the confirmatory results of their own experiments and conclude that the transmission of *Trichinella* is not a simple problem as many animals, in addition to pigs, rats and mice, may eat infected flesh and pass the cysts or larvae in their faeces. Improved sanitary feeding and storage conditions are therefore of greater importance than have been recognized heretofore. R. T. Leiper

**2331**—SLANINA, L., 1958. [Katedra vnútorných chorôb II, Veterinárska fakulta, Košice, Czechoslovakia.] "Klinický obraz a diferenciálna diagnóza pri fasciolóze rožného statku, oviec a kôz." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 31 (12), 971-980. [English, German & Russian summaries pp. 979-980.]

Under Slovakian conditions acute fascioliasis was observed in sheep from the autumn until the late spring. One of the symptoms was loss of wool. Mortality reached 80% to 100% and the animals died five to nine days after the appearance of the first symptoms. In cattle acute and chronic forms of the disease were rarer and affected mainly young animals. Chronic fascioliasis appeared from the end of the autumn until February and March, when it reached its peak. In the mountainous zone it could still be observed in May. Cattle were more resistant to both forms of the disease. The author also discusses the differential diagnosis of fascioliasis. N. Jones

**2332**—SURYNEK, J. & MACH, P., 1957. [Ústav pro patologickou fyziologii, Veterinární fakulta, Brno, Czechoslovakia.] "Působení bílkovinného extraktu z askarid na organismus zvířat. II. Příspěvek k otázce vzniku přecitlivělosti." *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, 30 (4), 261-280. [English, German & Russian summaries pp. 279-280.]

Protein extract of pig *Ascaris*, injected intravenously into rabbits 25 to 28 days after experimental infection with this nematode, caused anaphylactic shock. The extract also produced anaphylactic shock in pigs harbouring *Ascaris*. N. Jones

- 2333—TRAVASSOS, L., FREITAS, J. F. TEIXEIRA DE, MACHADO DE MENDONÇA, J. & OLIVEIRA RODRIGUES, H. DE, 1960. "Excursão a Cabo Frio, Estado do Rio de Janeiro." *Atas da Sociedade de Biologia do Rio de Janeiro*, 4 (5), 70-71.

*Filicollis* sp., *Tetrameres* sp., *Ornithobilharzia canaliculata*, *Philophthalmus lachrymosus* and cestodes were found in *Larus dominicanus*, and *Physaloptera* spp. and *Thelandros* sp. in *Ameiva ameiva* from Cabo Frio, Rio de Janeiro. W. M. Fitzsimmons

- \*2334—ULYANOV, S. D., 1957. [The part played by wolves and jackals in the distribution of larval cestodes in animals.] *Trudi Kazanskogo Nauchno-Issledovatel'skogo Veterinarnogo Instituta*, 9, 402-404. [In Russian.]

- 2335—VIBE, P. P., 1959. [Nauchno-issledovatel'ski veterinarni institut, Kazakhskaya Akademiya sel'skokozyaistvennikh nauk, U.S.S.R.] [The role of farm animals in the life-cycle of *Echinococcus multilocularis* Leuckart, 1863.] *Dokladi Akademii Nauk SSSR*, 129 (2), 471-472. [In Russian.]

The proportion of *Echinococcus multilocularis* in hydatid infections of slaughtered animals at the Semipalatinsk meat station and of the population showed the region to be a focus of multilocular echinococcosis. To show conclusively that *E. multilocularis* can develop in sheep and cattle, Vibe used two puppies aged two months and previously wormed with arecoline hydrobromide. One, given infected sheep liver had 1,000 *E. multilocularis* in the intestine when examined 110 days later; in the second which had received infected sheep and cattle liver, 500 *E. multilocularis* were found on the 105th day. The cestodes differed in measurements and morphology from the *E. granulosus* common in local dogs. G. I. Pozniak

## FISHERIES HELMINTHOLOGY

### Fresh-Water Fisheries

- 2336—AGAPOVA, A. I., 1960. [Parasites of fish in water reservoirs in the Kustanay region.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, 12, 195-205. [In Russian.]

- 2337—CORKUM, K. C., RINGHOUSE, R. & ROESCH, S., 1958. "A parasite of the swim bladder of black catfish." *Transactions of the Illinois Academy of Science*, Year 1957, 50, 301-302.

The authors report that they found 83% of 29 *Ameiurus melas* in the Fox River, 18 miles north of Aurora, infected with *Acetodextra amiuri*. This is the first report of this parasite in Illinois catfishes and the highest infection rate hitherto recorded. The number of trematodes present in the swim bladder varied from one to nine. Fish less than two inches long were not infected. S. Willmott

- 2338—GUPTA, S. P., 1961. [Institute of Parasitology, McGill University, Macdonald College P.O., Que., Canada.] "A reference list of trematode parasites of fresh-water fishes of India, with a discussion on their systematic position." *Indian Journal of Helminthology*, 13 (1), 35-60.

Gupta lists 55 species representing 14 families of Indian fishes from which digenetic trematodes have been recorded and 32 species representing eight families of Indian fishes from which monogenetic trematodes have been recorded; in each case the author of the record, the year, the locality and the habitat of the parasite are given. Gupta disagrees with Yamaguti (1958) in respect of the synonymy of several genera and species of trematodes and considers: *Plesiodistomum*, *Phyllochorus* and *Phyllodistomum*, and *Neoganada*, *Orientocreadium* and *Ganadotrema* to be groups of distinct genera; *Lucknoides* to be distinct from *Neopecoelina*, *Ophiocorchis* from *Genarchopsis* and *Neopodocotyle* from *Podocotyle*; *Emoleptalea* to be synonymous with *Cephalogonimus* and *Bucephalopsis belonea* with *B. karvei*; *B. magnum* to be a valid species, *B. confusus* and *B. minimus* to be synonymous with *B. garuai*. *Opisthorchis pedicellata* and *O. pedicellata minuta* are considered identical. The author does not agree with Jaiswal (1957) in his division of the genus *Phyllodistomum* into four subgenera [for abstract see Helm. Abs., 26, No. 481a]. There are 83 references. J. W. Smith



**2339**—GVOZDEV, E. V. & AGAPOVA, A. I., 1960. [The formation of the contemporary parasite fauna of fish in Balkhash-Ili basin.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, **12**, 183–191. [In Russian.]

**2340**—HARMS, C. E., 1960. [Zoology Department, University of Kansas, Lawrence, Kansas, U.S.A.] "Some parasites of catfishes from Kansas." *Journal of Parasitology*, **46** (6), 695–701.

Of the 135 catfishes including three species, *Ictalurus punctatus*, *I. melas* and *I. natalis* examined over a period of two years except during the months of November, December and January, 124 harboured at least one species of helminth parasite. 24 species including nine trematodes, three cestodes, two acanthocephalans, six nematodes, two leeches and two copepods were collected. The degree of parasitism was affected by the ecological habitat of the host and season of the year more than by size of the host. The peak of infection occurred in June, July and August when 90% to 100% of the fish examined were parasitized. Leeches, copepods and monogenetic trematodes were significantly fewer in ponds than in lakes and streams. The gut harboured 44.2% of all the parasites found; 43% were on the gills, 1.2% in the urinary bladder, 0.1% on the skin and 10.7% in parts of the body which had no direct access to the exterior.

H. H. Williams

**2341**—KULAKOVSKAYA, O. P. & KROTAS, R. A., 1961. [*Khavia sinensis* Hsü (Cestoda, Caryophyllaeidae), a parasite introduced from the Far East into carp farms in western regions of the U.S.S.R.] *Dokladi Akademii Nauk SSSR*, **137** (5), 1253–1255. [In Russian.]

**2342**—LOPUKHINA, A. M., 1961. [The effect of *Triaenophorus nodulosus* Pallas (Cestoda, Pseudophyllidae) on the young of *Salmo gairdnerii*.] *Dokladi Akademii Nauk SSSR*, **137** (1), 244–247. [In Russian.]

42 of 100 young trout from a fish breeding pond were infected with *Triaenophorus nodulosus* plerocercoids. In infected fish the average weight and length were considerably reduced and, in the blood, the percentage of monocytes was higher (20%) and of lymphocytes lower (70.9%) than in uninfected fish; the haemoglobin content was within the normal limits. G. I. Pozniak

### Marine Fisheries

**2343**—DEGIUSTI, D. L. & NASIR, P., 1960. "Trematode parasites of the fish family Gobiidae from Naples, Italy and Bimini, B.W.I." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 13. Members of the Allocreadiidae, Bathycotylidae, Cryptogonimidae, Hemiuridae and Monorchidae were present in 2,732 specimens of *Gobius cobitis*, *G. paganellus* and *G. niger jazo* from the vicinity of Naples. In 1,031 specimens of *Bathygobius* from the vicinity of Bimini (B.W.I.) members of the Allocreadiidae, Fellodistomidae, Hemiuridae, Monorchidae and Bucephalidae occurred. *Helicometra fasciata* was found in both localities. S. Willmott

**2344**—KORATHA, K. J., 1960. "Preliminary report on the monogenetic trematodes of marine fishes of the Eastern Indo-Pacific." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 13–14. This author's abstract states that over 1,500 fish belonging to more than 140 species including elasmobranchs and teleosts were examined, that many new species and a few new genera of Monogenea were recorded and that these will be described in a series of papers dealing with each family. A species of *Calicotyle* and a species of *Calceostoma* were recorded from the American coast for the first time and a number of other new records made. A very high degree of host specificity was observed. The "law of geminate species" has been extended to these marine monogeneans. S. Willmott

**2345**—KORATHA, K. J., 1960. "Preliminary report on the parasites of a chimaerid fish *Hydrolagus collieri* (Lay and Bennett) from the Eastern Indo-Pacific with comments on the phylogenetic significance of parasitic distribution in Holocephali." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 14.

The following helminths were collected from *Hydrolagus collieri*: one specimen of Chimaericolidae, two adult *Otodistomum* sp., four specimens of *Gyrocotyle* sp. and one specimen of *Branchellion* sp. S. Willmott

## Miscellaneous

- 2346—KING, R. & NOBLE, E. R., 1960. "Ecology of the fish *Gillichthys mirabilis* and its parasites." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 9.

[For abstract of a fuller account of part of this work see No. 2347 below.]

- 2347—NOBLE, E. R. & KING, R. E., 1960. [University of California, Santa Barbara, California, U.S.A.] "The ecology of the fish *Gillichthys mirabilis* and one of its nematode parasites." *Journal of Parasitology*, **46** (6), 679–685.

*Spirocamallanus pereirai* was the commonest of the 15 parasites recovered from the mud-sucker, *Gillichthys mirabilis*, from a tidal estuary near Santa Barbara, California. 800 out of 810 of the fishes were infected. It was also collected from four other new hosts, *Leptocottus armatus*, *Fundulus parvipinnis*, *Atherinops affinis* and *Girella nigricans*. Neither the host nor the parasite appeared to be influenced by marked fluctuations in water salinity. Haemoglobin was found in the intestinal contents of the parasites. Four figures of *S. pereirai* are given and the presence of three pairs of pre-anal and six pairs of post-anal papillae was observed. N. Jones

## NEMATOTOLOGY

### Free-Living Nematoda

- 2348—HOPPER, B. E., 1961. [Nematology Section, Entomology Research Institute, Canada Department of Agriculture, Ottawa, Canada.] "Occurrence of an egg-string in *Enoplus communis* Bastian, 1865 (Nematoda: Enoplidae)." [Correspondence.] *Nature*, **London**, **189** (4761), 331–332.

*Enoplus communis*, a marine nematode, lays its eggs in a string enclosed in a continuous transparent sheath. The sheath is adhesive and, in the specimen observed, contained 22 eggs which were segmented to the six- or eight-cell stage of development. Eggs within adult females were unsegmented. H. R. Wallace

### Plant-Parasitic Nematoda

- 2349—ANON., 1960. "Import interceptions." *Canadian Insect Pest Review*, **38** (7), 265.

Soil associated with roots of roses from Holland contained several nematode species including a *Pratylenchus* sp. close to *P. convallariae* and a large number of *Tylenchorhynchus bursifer*.

D. J. Hooper

- 2350—BINGEFORS, S., 1960. "Stem nematode in lucerne in Sweden. I. A survey of the distribution of stem nematode in lucerne-growing areas." *Lantbrukshögskolans Annaler*, **26**, 317–322.

Attacks by stem nematodes (*Ditylenchus dipsaci*) in lucerne are common in southern Sweden where more than 50% of the farms surveyed were infected. There is reason to believe that the nematodes are introduced by imported seed. Co-operative use of harvesting machinery may spread the nematodes from farm to farm. S. Binge-fors

- 2351—BIRD, A. F., 1960. [C.S.I.R.O., Commonwealth Research Station, Merbein, Victoria, Australia.] "The effect of some single element deficiencies on the growth of *Meloidogyne javanica*." *Nematologica*, **5** (2), 78–85. [German summary p. 85.]

Tomatoes growing in a series of nutrient solutions each deficient in a single major element were inoculated with larvae of *Meloidogyne javanica*. At intervals plants were removed and records made of dry weights and growth of the nematodes. Nematode growth was measured by means of cross-sectional areas taken on nematodes dissected from the galls. The nematodes grew consistently faster in plants growing in solutions deficient in nitrogen, magnesium, iron or potassium. In a second series of experiments the infected plants were grown either with full nutrients or in solution lacking nitrogen. The most rapid growth of the nematodes was again in the nitrogen-deficient solution. On the 24th day egg sacs were produced in 53% of females in the nitrogen-deficient plants compared with 8% on plants with full nutrition. The larvae were shown to be viable and greater numbers were produced on the former plants.



It is suggested that increased nematode growth in plants with single element deficiencies may be associated with accumulation in the plants of products beneficial to the nematodes.

M. T. Franklin

**2352**—BIRD, A. F. & BROWNELL, P. F., 1961. [Commonwealth Research Station, C.S.I.R.O., Merbein, Victoria, Australia.] "Growth of a nematode in tomato plants grown on sodium-deficient water cultures." [Correspondence.] *Nature, London*, **189** (4762), 418–419.

Tomato plants were grown in nutrient solutions virtually free from sodium or with 0.1 m. equiv. per litre of sodium sulphate, and were analysed after 7, 14 or 28 days' growth. Roots of some plants were exposed to infective larvae of *Meloidogyne javanica* in 0.5% agar for 48 hours, then washed and replaced in the nutrient solution. The nematodes developed normally in infected plants of both series and the chemical analyses indicated that *M. javanica* removed a negligible amount of sodium from its host, although several hundred nematodes were present.

M. T. Franklin

**2353**—BOVIEN, P. & JØRGENSEN, J., 1960. "Plantesygdomme i Danmark 1957." *Tidsskrift for Planteavl*, **64**, 553–613. [English summary pp. 599–613.]

Pests are described by Bovien & Jørgensen and include some nematode attacks. Cereal-root eelworm (*Heierodera avenae*) was very common. The beet eelworm (*H. schachtii*) severely attacked fields where beets were grown frequently. A few attacks on swedes are mentioned. The potato-root eelworm (*H. rostochiensis*) severely attacked potatoes grown year after year in small gardens. On farms attacks were rarely found. Stem eelworm (*Ditylenchus dipsaci*) was reported from red and white clover but only seldom were the plants seriously damaged; attacks in lucerne have increased; attacks in a fodder beet field and in strawberries have been reported. An investigation of stem nematode attacks in shallots showed an extensive infection of this crop in one part of Denmark. Symptoms of attacks of strawberry eelworm (*Aphelenchoides* spp.) were very obvious but selection of healthy plants has reduced the infections in bigger plantations.

S. Bingefors

**2354**—COLBRAN, R. C. & SAUNDERS, G. W., 1961. "Nematode root-rot of bananas." *Queensland Agricultural Journal*, **87** (1), 22–24.

**2355**—DECKER, H., 1960. [Institut für Phytopathologie und Pflanzenschutz der Universität Rostock, Germany.] "*Pratylenchus penetrans* als Ursache von 'Müdigkeitserscheinungen' in Baumschulen der DDR." *Nematologica. Supplement II*, pp. 68–75. [English summary p. 74.]

Decker investigated instances of "soil-sickness" in fruit-tree nurseries on light soil in the Rostock region of East Germany. Apple was more affected than pear, with plum least affected. [The data on depth and seasonal distribution of *Pratylenchus penetrans*, the predominant plant nematode present, is given more fully elsewhere—for abstract see Helm. Abs., **30**, No. 1660.] To test some current theories on the cause of the disease, he grew apple seedlings in untreated and in steam-sterilized "sick" soil with and without added suspensions of *P. penetrans*; in other tests he added fertilizers, borax and chopped-up apple roots. None of the last three treatments had a marked effect, so the trouble apparently was not due to deficiency of these nutrients nor to toxic plant residues. Steam sterilization of the soil caused a marked improvement in growth and addition of *P. penetrans* to steam sterilized soil an equally marked retardation.

R. D. Winslow

**2356**—DOLLIVER, J. S., 1961. [Cornell University, U.S.A.] "The role of the host plant in population changes of *Pratylenchus* spp." *Dissertation Abstracts*, **21** (7), 1698–1699.

Severe restriction of root growth in *Pisum sativum* limits the number of *Pratylenchus* spp. in each root system. On peas grown in sand with tap-water the nematode population was double that on comparable plants given nutrients. The factors affecting the emergence of *Pratylenchus* from *Dactylis glomerata* roots have been investigated.

J. W. Smith

**2357**—FENWICK, D. W., 1959. "Red ring of coconuts—a problem for the nematologist." *Indian Coconut Journal*, **12** (3/4), 82–86.

[This paper has already been published in *Span. London*, 1958, No. 2, pp. 5–7. For abstract see Helm. Abs., **27**, No. 294a.]

- 2358—GOFFART, H., 1960. [Biologische Bundesanstalt, Institut für Hackfruchtkrankheiten und Nematodenforschung, Münster/Westf., Germany.] "Populationsveränderungen des Kartoffelnematoden (*Heterodera rostochiensis* Woll.) beim Anbau nematodenresistenter und nematodenanfälliger Kartoffelsorten unter Berücksichtigung des Auftretens aggressiver Biotypen." **Nematologica. Supplement II**, pp. 76-83. [English summary p. 83.]

The potato variety 18/53 reduced the population level of *Heterodera rostochiensis* by 90% in the first year. Resistance-breaking types of the eelworm constituted 1.5% of the population and did not appear to affect this decrease. Goffart suggests that the occurrence of resistance-breaking types is controlled by both genetic and environmental factors. Root diffusate from variety 18/53 gave a higher emergence rate of larvae from cysts than did that from other potato varieties.

H. R. Wallace

- 2359—GOODEY, J. B., 1960. [Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, England.] "Gall-forming nematodes of grasses in Britain." **Journal of the Sports Turf Research Institute, Bingley**, Year 1959, 10, 54-60.

This is a semi-popular account of the effects of four nematodes that attack grasses in Britain. A short introduction is followed by brief descriptions of the life-histories and the effects on the plant of *Anguina agrostis*, *A. graminis*, *Ditylenchus graminophilus* and *D. radiculicola*. Mention is made of the presence of toxins in galls due to *A. agrostis* on Chewings' fescue and the fact that the abnormalities caused by *A. agrostis* have not been recognized as pathogenic and have been used as a basis for new species of grass. There is a short section commenting on gall formation.

J. B. Goodey

- 2360—GUIRAN, G. DE, 1960. "Étude comparative de la pénétration des larves de *Meloidogyne javanica* (Treub, 1885) Chitwood, 1949 et de *Meloidogyne incognita acrita* Chitwood, 1949 dans les racines des plantes hôtes et non hôtes. Résultats préliminaires." **Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent**, 25 (3/4), 1047-1056.

Seedlings of *Crotalaria astragalina* and tomato, placed on silica gel were inoculated with larvae of *Meloidogyne javanica* or *M. incognita* var. *acrita*. At daily intervals for a week some of the plants were put in a mistifier for extraction of nematodes or were stained for assessing nematode development. When *M. javanica* was used about 50% of the inoculated larvae entered the roots of both plant species. Half of these larvae re-emerged from *crotalaria* roots placed in the extractor two days after inoculation; on subsequent days fewer and fewer larvae emerged until on the eighth day after inoculation practically none came out. No larvae emerged from tomato roots treated in the same way and swellings were visible 48 hours after inoculation. Larvae extracted from *crotalaria* roots were capable of invading tomato and of causing gall formation. Development of larvae in tomato was normal but in *crotalaria* it probably went no further than the second moult and the larvae had a starved appearance. With *M. incognita* var. *acrita* only 1% to 2% of the inoculated larvae entered *crotalaria* while 50% entered tomato.

M. T. Franklin

- 2361—JØRGENSEN, J. & LINDHARDT, K., 1960. "Plantesygdomme i Danmark 1958." **Tidsskrift for Planteavl**, 64, 737-800. [English summary pp. 785-800.]

Among pests described by Jørgensen & Lindhardt some important nematodes are mentioned: the cereal root nematode (*Heterodera avenae*) has caused considerable damage, particularly in oats and barley in all parts of Denmark; the beet eelworm (*H. schachtii*) was rather common on beets but no attacks on swedes were reported. Growing of spinach has increased the attacks in one area. Many new attacks by the potato-root eelworm (*H. rostochiensis*) were found in gardens but few in fields. The stem eelworm (*Ditylenchus dipsaci*) severely damaged lucerne in a number of fields. Attacks in red clover were unimportant. Strawberry eelworms (*Aphelenchoides* spp.) were wide-spread in gardens. New attacks were described by bud and leaf nematodes (*A. ritzeana-bosi*) in *Peperomia caperata*, by *H. trifolii* in *Trifolium pratense* and *T. repens*, and by root-knot nematodes (*Meloidogyne* spp.) in roses; they also attacked carrots.

S. Bingefors



**2362**—JUSTESEN, S. H. & TAMMES, P. M. L., 1960. [Centre of Mathematics in Agriculture, Wageningen, Netherlands.] "Studies of yield losses. I. The self-limiting effect of injurious or competitive organisms on crop-yield." *Tijdschrift over Plantenziekten*, **66** (5), 281–287. [Dutch summary p. 285.]

Intraspecific competition between pathogens decreases the effect of individuals as numbers increase. Mathematical formulae developed from four hypothetical models illustrate this fact and show that effects on crop yield are density dependent. The effect on yield falls off as the initial population increases. *Heterodera rostochiensis*, *H. avenae* and *H. schachtii* are quoted in examples of this host-parasite relationship. H. R. Wallace

**2363**—KRADEL, J., 1960. [Biologische Zentralanstalt Berlin der Deutschen Akademie der Landwirtschaftswissenschaften, Klein-machnow bei Berlin, Germany.] "Mehrjährige Untersuchungen zum Wirtspflanzenkreis einer Herkunft des Stock- und Stengelälchens (*Ditylenchus dipsaci*)."  
*Nematologica. Supplement II*, pp. 40–48. [English summary p. 47.]

Kradel reports on observations made over many years on host plants of the stem eelworm *Ditylenchus dipsaci*, including previously unknown hosts, and gives data on seed-borne transmission. Detailed results are given of field experiments, from 1956–58, with various crops including rye. The data show a probable connection between the intensity of attack on rye and the weather in March to June. The intensity of *D. dipsaci* attack on different plant species varies under similar weather conditions and seems to be determined by their specific ability for rapid early development. Environmental conditions may considerably modify the intensity of attack and the production of symptoms; these factors may have been responsible in the past for the delineation of distinct biological races which are in fact only modifications from the given range of variation. D. J. Hooper

**2364**—LE BERRE, J. R. & RITTER, M., 1960. [Institut National des Recherches Agronomiques, Versailles, France.] "Étude histologique de nématocécidies en microscopie de fluorescence."  
*Nematologica. Supplement II*, pp. 144–148. [German summary p. 148.]

Sections of mature galls due to *Meloidogyne incognita* in several plant species were treated with a number of fluorescent stains and examined microscopically by mercury vapour illumination. In tomato roots the epidermis and the lignified and suberised tissues became fluorescent, but not the phloem. The endodermis showed up well with coriphosphine and auramine. Similar effects were obtained in the other plants but the intensity and persistence of the fluorescence varied. Females, larvae and eggs of the nematode showed strong fluorescence with some stains but not all. A description is given, illustrated by photographs, of the tissues in large tomato galls, which are particularly well shown up by coriphosphine.

M. T. Franklin

**2365**—MAI, W. F., 1961. [Department of Plant Pathology, Cornell University, Ithaca, New York, U.S.A.] "Sugar beet nematode found in New York State." *Plant Disease Reporter*, **45** (2), 151. Large numbers of immature *Heterodera schachtii* females were found in the roots of unthrifty red beet (*Beta vulgaris*) growing in New York State. Larvae and cysts were recovered from the soil in an area of the infested field where many of the beet plants were dead. This is thought to be the first record of *H. schachtii* in New York State. D. J. Hooper

**2366**—MINTON, N. A., 1961. [Auburn University, Alabama, U.S.A.] "Investigations into the resistance of cotton to root-knot nematodes, *Meloidogyne* spp." *Dissertation Abstracts*, **21** (10), 2851.

\***2367**—MISHKINA, L. P., 1957. [Nematodes of potatoes in the Gorkov region.] *Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut*, **19**, 93–100. [In Russian.]

**2368**—NOLTE, H. W., 1960. [Biologische Zentralanstalt, Aschersleben, Germany.] "*Ditylenchus dipsaci* (Kühn) an Knoblauch (*Allium sativum* L.)." *Nematologica. Supplement II*, pp. 61–63. [English summary p. 63.]

Nolte describes and illustrates the symptoms of an attack by *Ditylenchus dipsaci* on garlic (*Allium sativum*). The leaves die from the tip downwards and the bulb tissue is loose but not

swollen; these symptoms may be mistaken for injury by the onion fly. Other host plants of the *D. dipsaci* population in question include onion (*A. cepa*), *Pisum sativum*, *Fagopyrum sagittatum*, *Phaseolus vulgaris* and some weeds.  
D. J. Hooper

- 2369**—PHILIP, A., 1957. [Central Tobacco Research Institute, Rajahmundry, India.] "Important pests of tobacco and their control, with a field key for their identification." **Indian Tobacco**, **7** (2), 97–103.

In a survey of the chief pests of tobacco in India, brief mention is made of the root-knot nematodes, genus *Meloidogyne* [no species given]. The nature of the injury and control by fallowing and rotation are briefly described.  
H. R. Wallace

- 2370**—ROBINSON, P. E., 1961. [The Colonial Sugar Refining Co. Ltd., Macknade Mill, P.O. Box 59, Macknade, Australia.] "Root-knot nematodes and legume nodules." **Nature, London**, **189** (4763), 506–507.

Robinson reports the common occurrence of *Meloidogyne javanica* in *Vigna sinensis* and *Stizolobium* sp. growing in the sugar-cane belt in Australia. Nematodes were present sometimes only in the bacterial nodules, sometimes in all parts of the root system. Nodules may be invaded at any stage of growth, giant cells are formed in them, and there may be secondary invasion by later generations of the nematode.  
M. T. Franklin

- 2371**—SAYED, M. Q., 1961. [Pennsylvania State University, U.S.A.] "The effect of nutrition, pH and nematodes on damping-off disease of pea, tomato and cucumber." **Dissertation Abstracts**, **21** (7), 1701–1702.

- 2372**—SEINHORST, J. W., 1960. [Institut voor Plantenziektenkundig Onderzoek, Wageningen, Netherlands.] "Over het bepalen van door aaltjes veroorzaakte opbrengstvermindering bij cultuurgewassen." **Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent**, **25** (3/4), 1025–1039. [English & French summaries p. 1038.]

Seinhorst makes observations on the estimation of the reduction in yield of horticultural and agricultural crops caused by nematodes. Nematicides and previous crops appear to influence yield in ways other than by reducing the number of plant-parasitic nematodes in the soil. With nematicidal treatments it is generally impossible to estimate which part of the increase in yield is due to killing of nematodes and which part is caused by other effects of the treatment. Influences of previous crops on yield other than those affecting the nematode population density should, if possible, be avoided or at least recognized. Measurable damage only occurs when the population density exceeds a certain limit and then there is a more or less rectilinear relationship between crop yield and the logarithm of the population density of the nematodes.

D. J. Hooper

- 2373**—SMART, Jr., G. C., 1960. [University of Wisconsin, U.S.A.] "Pathogenicity, morphology, and life cycle of certain isolates of *Ditylenchus destructor*." **Dissertation Abstracts**, **21** (6), 1326–1327.

- 2374**—SPRAU, F., 1959. [Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, München, West Germany.] "Bemerkenswerte Schäden an verschiedenen Pflanzenarten, wahrscheinlich verursacht durch den freilebenden Nematoden *Longidorus maximus* (Bütschli 1874), Thorne & Swanger 1936." **Pflanzenschutz, Munich**, **11** (2), 27–30.

Sprau investigated instances of poor growth in various crops and weeds in parts of Bavaria. Stunted and dying plants in circular, oval or irregularly shaped patches were found to have characteristic terminal, sickle-shaped root galls similar to those associated with injury by *Xiphinema*. *Longidorus maximus* was invariably present, in appreciable numbers in the root zone of the unhealthy root-galled plants, being absent or very scarce around the roots of healthy plants. No other plant-parasitic nematode was consistently associated with the disease. The paper is illustrated by photographs of the nematode and of field and root symptoms. Crop plants showing characteristic symptoms include gladioli, scorzonera, carrot, celery, cucumber, lettuce, leeks, onion, red beet, sunflower, tobacco and potato. A number of weeds are also listed as susceptible; *L. maximus* was also associated with similar injury to Scots pine and spruce in tree nurseries.

R. D. Winslow



- 2375**—SPRAU, F., 1960. [Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, München, West Germany.] "Über ein vermutlich pflanzenschädigendes Auftreten eines freilebenden Nematoden, *Longidorus maximus* (Bütschli) an einer Reihe von Kulturpflanzen." *Nematologica. Supplement II*, pp. 49–55. [English summary p. 55.]

The greater part of this paper is essentially a repetition of an earlier publication [for abstract see No. 2374 above], augmented by the inclusion of a distribution map of instances of crop damage by *Longidorus maximus*, the scientific names of susceptible and other crop and weed plants, and an account of experiments in control, using D-D mixture and Vapam.

R. D. Winslow

- 2376**—STURHAN, D., 1960. "Einige bemerkenswerte Vorkommen des Stengelälchens, *Ditylenchus dipsaci* (Kühn), in Bayern." *Pflanzenschutz. Munich*, **12**, 178–179.

Sturhan gives details and describes symptoms shown by various plants attacked by stem eelworm, *Ditylenchus dipsaci*, in Bayern. New records include *D. dipsaci* on *Digitalis grandiflora*, *A. parviflora*, *Hibiscus* sp. and *Colchicum autumnale*. There was also a severe attack by *Aphelenchoides ritzema-bosi* on *Helianthus annuus*.

D. J. Hooper

- 2377**—VIGLIERCHIO, D. R., 1960. [Department of Plant Nematology, University of California, Davis, California, U.S.A.] "Resistance in *Beta* species to the sugar beet nematode, *Heterodera schachtii*." *Experimental Parasitology. New York*, **10** (3), 389–395.

*Heterodera schachtii* does not develop on *Beta patellaris*, *B. webbiana* or *B. procumbens* at temperatures between 10°C. and 30°C. *B. maritima* produced significantly less cysts than sugar-beet at 15°C. and probably also at higher temperatures. Susceptibility appeared to be transferred to *B. maritima* from sugar-beet scions. That fewer females developed on sugar-beet stocks with resistant scions than on normal sugar-beets suggests a transference of resistance but it is possible that this was related to the reduced root system on the grafted sugar-beet stock.

H. R. Wallace

- 2378**—VIGLIERCHIO, D., 1961. "*Heterodera schachtii*, hatching of field importance." *Journal of the American Society of Sugar Beet Technologists*, **11** (4), 294–301.

Pots containing sugar-beet were infected with 100 infective second-stage larvae of *Heterodera schachtii*. Cyst numbers increased exponentially and empty cysts appeared after about 15 weeks. Viglierchio suggests that a cyst count in the field is meaningless as an estimate of population potential; a hatching test followed by squashing the cysts to determine the remaining viable eggs must be made. Larvae emerged in large numbers from white females less than 36 days old with no egg masses. Sugar-beet diffusate increased the emergence rate. Viglierchio stresses the importance of environmental history of cysts on their subsequent hatch.

H. R. Wallace

- 2379**—WAGNER, F., 1959. [Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Aussenstelle Würzburg, West Germany.] "Über Versuche zur Nematodenbekämpfung in Forstbaumschulen." *Pflanzenschutz. Munich*, **11** (2), 31–32.

Wagner treated three nematode-infested sites in a forest nursery with D-D mixture and Vapam, the former injected at 60 ml., the latter watered in at 100 ml. per sq. m. The treatments were applied on 28th March and pine seeds sown on the treated plots and untreated controls on 8th May. Germination counts showed that this interval was insufficient in the case of the D-D plots, on which seedling emergence was reduced by 44% compared with the Vapam and untreated plots. Subsequent root development and general growth were very poor on the untreated plots where many seedlings died. A final assessment 18 months after sowing gave mean counts of 877, 484 and 197 plants per sq. m. on the Vapam, D-D and untreated plots respectively. Plant-parasitic nematode genera present included *Pratylenchus*, *Tylenchorhynchus* and *Longidorus*, but apparently no direct assessment of nematode control was made.

R. D. Winslow

- 2380**—WARD, C. H., 1961. [Cornell University, U.S.A.] "Occurrence, distribution and populations of plant parasitic nematodes associated with forage crops in New York State." *Dissertation Abstracts*, **21** (7), 1702.

*Helicotylenchus*, *Meloidogyne*, *Paratylenchus*, *Pratylenchus*, *Tylenchorhynchus* and *Xiphinema*

were the commonest genera of nematodes found in soil samples on which forage crops are grown in New York State. *Heterodera trifolii* and *P. pratensis* restrict the growth of clover and lucerne. It is concluded that plant-parasitic and pathogenic nematodes could be a limiting factor in forage production in New York State. J. W. Smith

- 2381**—WEISCHER, B., 1960. [Biologische Bundesanstalt, Institut für Hackfruchtkrankheiten und Nematodenforschung Münster (Westf.), Germany.] "Untersuchungen über das Auftreten pflanzenparasitärer Nematoden in Weinbergsböden." **Nematologica. Supplement II**, pp. 29–39. [English summary p. 38.]

Weischer records plant-parasitic or suspected plant-parasitic nematodes occurring in vineyard soils at ten widely separated sites in Germany. The following genera were found: *Paratylenchus*, *Criconeimoides*, *Helicotylenchus*, *Pratylenchoides*, *Xiphinema*, *Gottholdsteineria*, *Pratylenchus*, *Macrotrophurus* and *Hemicyclophora*. The first three genera occurred at all sites. *Pratylenchoides* was found at four and *Xiphinema* at three sites. The other genera were only found at one site. *Paratylenchus* reached its maximum density in soil layers below 50 cm. and the moisture content of the soil appeared to be its limiting factor. The other genera were commonest in the upper soil layer, 5 cm. to 10 cm. D. J. Hooper

### Insect-Parasitic Nematoda

- 2382**—CALLOT, J., 1959. [Institut de Parasitologie, Faculté de Médecine, Strasbourg, France.] "Action d'un *Agamomermis* sur les caractères sexuels d'un cératopogonidé." **Annales de Parasitologie Humaine et Comparée**, **34** (3), 439–443.

About 5% of the *Culicoides albicans* captured in Strasbourg in June were parasitized by a mermithid larva; both sexes were equally infected but whereas the infection had little obvious effect on the females the change induced in the males was very striking and led to their appearance being that of intersexes; the male copulatory apparatus was not affected but the antennae were markedly changed. S. Willmott

- 2383**—KLOSS, G. R., 1959. [Instituto Oswaldo Cruz, Rio de Janeiro, D.F., Brazil.] "Nematoides parasitas de Gryllotalpidae (Orthoptera) do Brasil." **Memorias do Instituto Oswaldo Cruz**, **57** (2), 137–170.

14 species of 12 genera in three families of the Oxyuroidea, presently known in world literature as parasites of the Gryllotalpoidea, are listed according to a classification based on the structure of the nematode genitalia. Both geographical and host records for these species are tabulated. 11 species of ten genera known as parasites of Brazilian Gryllotalpoidea are described and illustrated. H. E. Welch

- 2384**—WEISER, J., 1958. [Laboratorium für Insektenpathologie, Institut für Biologie der Tschechoslowakischen Akademie der Wissenschaften, Praha, Czechoslovakia.] "Ein neuer Nematode als Parasit der Engerlinge des Maikäfers, *Melolontha melolontha* in der Tschechoslowakei." **International Conference of Insect Pathology and Biological Control (1st, Prague, 1958. Transactions)**, pp. 331–336.

*Neoalectana melolonthae* n.sp., from larvae of *Melolontha melolontha* and *M. hipocastani*, collected near Malacky, Slovakia, is described with notes on its biology. H. E. Welch

### Nematoda Parasitic in Other Invertebrates

- 2385**—CHERNIN, E., MICHELSON, E. H. & AUGUSTINE, D. L., 1960. [Department of Tropical Public Health, Harvard School of Public Health, Boston 15, Massachusetts, U.S.A.] "*Daubaylia potomaca*, a nematode parasite of *Helisoma trivolvis*, transmissible to *Australorbis glabratus*." **Journal of Parasitology**, **46** (5), 599–607.

Chernin *et al.* report *Daubaylia potomaca* as a natural infection in *Helisoma trivolvis* from a stream in Cheboygan, Michigan. The authors describe the experimental infection of *Australorbis glabratus* with the nematode. Eggs, larvae and adult nematodes were seen in various deep tissues of the snails including the heart, the saccular portion of the kidney and



the foot but only rarely in nervous tissue; photomicrographs show different stages of the parasite in various host tissues. When present, pathological changes in the snail involved local destruction of muscle and connective tissue fibres; mortality among snails was variable. Often seemingly unaffected snails contained many parasites and, conversely, sluggish or moribund snails often contained only a few. Chernin *et al.* speculate on the life-cycle of *D. potomaca* and indicate its possible use in the biological control of *A. glabratus*. J. W. Smith

### Control

**2386**—PERRY, V. G., 1961. "Development of research in plant nematology." **Agricultural Chemicals**, Baltimore, 16 (2), 41, 96.

**2387**—OOSTENBRINK, M., 1960. "*Tagetes patula* L. als voorvrucht van enkele land- en tuinbouwgewassen op zand- en dalgrond." **Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent**, 25 (3/4), 1065–1075. [English summary pp. 1074–1075.] *Tagetes patula* suppressed population growth of *Meloidogyne hapla*, *Pratylenchus* spp. and *Tylenchorhynchus* spp. Populations of *Rotylenchus robustus* were less suppressed and larvae within cysts of *Heterodera rostochiensis* were not affected by a crop of marigolds. Marigold as a preceding crop increased the yield of most crops on sandy and peaty soils by about 10% to 40%. Oostenbrink suggests that the favourable influence of marigolds is due to their direct suppression of root-infesting eelworms. H. R. Wallace

**2388**—VASILEVSKI, A. P. & DAMANSKAYA, L. Y., 1958. [Glavni botanicheski sad Akademii nauk SSSR, U.S.S.R.] [The effect of thiophos on the phlox stem nematode.] **Byulleten Glavnogo Botanicheskogo Sada**, Year 1958, No. 31, pp. 98–100. [In Russian.] The authors have investigated the mode of action of thiophos (NIUIF-100) on *Ditylenchus phloxidis* in phlox [for abstract of an earlier paper on its efficacy see Helm. Abs., 23, No. 923b]. Infected plants were watered and sprayed with thiophos three times at ten-day intervals and a few days later portions of the plants were teased out in water and examined for nematodes. After the second and third treatment five times as many dead worms were present in treated material than in the untreated control plants. The cuticle of worms from treated plants had become more permeable; the thiophos acts on the eelworms within the plant. G. I. Pozniak

**2389**—WOESTIJNE, N. VAN DE & BRANDE, J. VAN DEN, 1960. "Gevoeligheid van plantenparasiterende aaltjes voor radioactieve straling." **Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent**, 25 (3/4), 1057–1064. [English, French & German summaries pp. 1063–1064.] Free-living nematodes were unaffected by radio-active radiation of less than 320,000 rad, a 64,000 rad dose was detrimental and 1,280,000 rad was lethal. A dose of 320,000 rad reduced the infectivity of *Heterodera rostochiensis* and *Meloidogyne hapla*. Because nematodes are more resistant to gamma radiation than plants, the use of hard radiation as a control method is not feasible, nor are such methods practicable for the control of nematodes in the soil. H. R. Wallace

**2390**—YOKOO, T., KOGA, T. & ÔMARU, T., 1961. [Faculty of Agriculture, Saga University, Saga-shi, Saga-ken, Japan.] [On the effect of nematicides on the root-knot nematode, *Meloidogyne incognita acrita*, in the carrot field.] **Agricultural Bulletin**, Saga University, No. 12, pp. 157–163. [In Japanese: English summary pp. 159–160.] Yokoo *et al.* tested the effect of D-D mixture, ethylene dibromide and emulsifiable and granular formulations of dibromochloropropane in controlling *Meloidogyne incognita* var. *acrita* on carrot. These chemicals increased the yield of carrot up to 1.5 to 2.0 times that of the untreated controls. The chemical treatment resulted in an increase of high quality carrots and an elongation of the roots up to 1.1 to 1.5 times that of the untreated controls. M. Ichinohe

## Miscellaneous

- 2391**—BIRCHFIELD, W., 1960. [Louisiana State University, Baton Rouge, Louisiana, U.S.A.] "A new species of *Catenaria* parasitic on nematodes of sugarcane." *Mycopathologia et Mycologia Applicata*, **13** (4), 331–338.

Birchfield describes the nematode-parasitic fungus *Catenaria vermicola* n.sp. which is abundant in sugar-cane soils in Louisiana. Zoospores, which swim, encyst on the nematode body near the oral opening, vulva or anus and a germ tube penetrates the cuticle and forms prominent septa in the nematode body. Sporangia of various shapes are eventually formed and zoospores may be seen in them after two or three days. The primary wall of the sporangia then balloons out and dissolves the nematode cuticle where it is touched and the secondary sporangial wall forms a papilla from which zoospores are discharged. 11 named species of plant-parasitic nematodes representing ten genera were attacked and destroyed by *C. vermicola*.

D. J. Hooper

- 2392**—DEUBERT, K. H., 1960. [Institut für Landwirtschaftliche Zoologie, Universität Halle (Saale), Germany.] "Untersuchungen über das Auftreten freilebender Nematoden in Fruchtfolgen (vorläufige Ergebnisse)." *Nematologica. Supplement II*, p. 28.

In this article, couched in very general terms, Deubert states that the density and composition of the soil nematode fauna is greatly influenced by such factors as soil climate, micro-organisms, decomposing organic matter and vegetation. [Precise data are not given.] R. D. Winslow

- 2393**—HUTCHINSON, M. T. & STREU, H. T., 1960. [Tea Research Institute, Talawakele, Ceylon.] "Tardigrades attacking nematodes." *Nematologica*, **5** (2), 149.

In a water extract from soil collected from near the roots of a *Vaccinium* sp. in New Jersey, U.S.A., tardigrades were found attacking nematodes. These suffered tears in the cuticle and became immobilized. Some tardigrades remained attached to nematodes during the process of killing, fixing and mounting. A preparation from Ceylon showed another [unnamed] tardigrade attached to a nematode. C. C. Doncaster

- 2394**—ZAMITH, A. P. L. & LORDELLO, L. G. E., 1957. [Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, Brazil.] "Algumas observações sobre nematódios em solo de mata e em solo cultivado." *Revista de Agricultura. São Paulo*, **32** (3), 183–188. [English summary p. 188.]

Soil samples collected from forest and cultivated soils in the State of São Paulo, Brazil, showed that there were more genera and species of nematodes in the forest soils. Zamith & Lordello suggest that removal of the original vegetation and cultivation destroyed groups of the nematode fauna. Some species persisted, however, and new species were introduced on infected plants and from other field sites. H. R. Wallace

## TAXONOMY

### Monogenea

- 2395**—EUZET, L. & RAZARIHELISOA, M., 1959. [Station Biologique, Sète, Hérault, France.] "Sur quelques monogènes de *Sphyaena commersonii* (Teleostei Sphyaenidae)." *Bulletin de la Société Zoologique de France*, **84** (1), 77–85.

*Pentatres sphyaenae* n.g., n.sp., 75 specimens of which were collected from five *Sphyaena commersonii*, is characterized by an asymmetrical posterior adhesive organ possessing five clamps on one side and three of a different shape on the other. A posterior languette is absent and the 22 to 26 testes, some of which are pre-ovarian, are arranged in two median rows. In these features it differs from *Allodiscocotyla*. The authors state that this new genus is difficult to classify but it is provisionally placed in the Gastrocotylidae, subfamily Vallisiinae. *Pseudolamellodiscus nossibei* n.sp., found on the gills of *S. commersonii*, differs from the genus *Pseudolamellodiscus* in the shape of the posterior adhesive organ, in having squamodiscs divided



into lateral lobes and an ovary which surrounds the left digestive caecum but the anatomy is insufficiently known to erect a new genus. *Chauhanea madrasensis* and *Vallisiopsis contorta* are recorded from *S. commersonii*.  
H. H. Williams

**2396**—EUZET, L. & TRILLES, J. P., 1960. [Station Biologique, Sète, Hérault, France.] "*Octolabea turchinii* n.g., n.sp. (Plectanocotylidae), un monogène nouveau, parasite de *Peristhedion cataphractum* (L.)." *Annales de Parasitologie Humaine et Comparée*, 35 (4), 504–508.

*Octolabea turchinii* n.g., n.sp. from the gills of *Peristhedion cataphractum* caught in the Gulf of Lions differs from *Plectanocotyle* and *Octoplectanocotyle*, the other genera of the Plectanocotylidae, in the absence of a posterior languette with hooks and in that it possesses a single, posteriorly situated testis.  
H. H. Williams

**2397**—EUZET, L. & WILLIAMS, H. H., 1960. [Station Biologique, Sète, Hérault, France.] "A re-description of the trematode *Calicotyle stossichii* Braun, 1899, with an account of *Calicotyle palombi* sp.nov." *Parasitology*, 50 (1/2), 21–30.

Euzet & Williams figure and redescribe *Calicotyle stossichii* from a study of 40 adults from the rectal glands, recta and cloacae of *Mustelus mustelus*, *M. canis* and *Centrophorus uyato*. They describe *C. palombi* n.sp., which closely resembles *C. stossichii*, but differs from it in at least six morphological and ecological characters. A discussion of the tendency towards the development of endoparasitism in the Calicotylidae is given together with a key to the species in the family.  
E. I. Sillman

**2398**—JAIN, S. L., 1959. [Department of Zoology, University of Lucknow, India.] "New dactylogyrid parasites from the gill filaments of cyprinid fishes from India." *Zeitschrift für Parasitenkunde*, 19 (5), 432–441.

Jain describes *Dactylogyrys batae* n.sp. from *Labeo bata*, and *D. orientalis* n.sp. and *D. gussevi* n.sp. from *Barbus stigma*, fish acquired at the Lucknow fish market. *D. batae* is nearest to *D. multispiralis*, *D. seenghali* and *D. rituis* but differs from these in the absence of supporting bars in the haptor and further from *D. multispiralis* in having only three loops in the cirrus, from *D. seenghali* in having relatively large anchors although the body is less than half the size and from *D. rituis* in the spirally coiled cirrus and prong-shaped accessory piece. *D. orientalis* resembles the Indian *D. moorthyi* in the shape of the cirrus and the anchors but differs from it in the V-shaped accessory piece, the presence of a horseshoe-shaped body at the vaginal opening and the shape of the transverse bar which is curved in the middle and swollen at the ends. *D. gussevi* is nearest to *D. longicirrus* from *B. stigma* and *Puntius ticto* but differs in the size of the body (0.31 mm. to 0.38 mm. long) and the anchors (0.061 mm. to 0.084 mm. long measured across the points), in the shape of the digitate accessory piece and the transverse bar which is swollen in the middle and at its ends.  
G. I. Pozniak

## Digenea

**2399**—ALDRICH, Jr., L. E., 1961. [Biology Department, Portland State College, Portland, Oregon, U.S.A.] "Two new digenetic trematodes from marine fishes of Puget Sound, Washington." *Journal of Parasitology*, 47 (1), 77–80.

Aldrich describes and figures two new digenetic trematodes from marine fishes of Puget Sound, Washington. *Fellodistomum phrissovum* n.sp. from the intestine of *Parophrys vetulus* differs from *F. agnotum* by being shorter, by possessing a prepharynx and oesophagus and by the testes and ovary being nearly twice as large as those of *F. agnotum*; the eggs of *F. phrissovum* are spined and measured 0.026 mm. by 0.031 mm. whereas the eggs of *F. agnotum* are spineless and measure 0.024 mm. by 0.048 mm. *Zoogonus dextrocirrus* n.sp. from the intestine of *Isopsetta isolepis*, *Lepidopsetta bilineata*, *Lumpenus anguillaris*, *Lycodes brevipes*, *Lycodopsis pacificus*, *Microstomus pacificus* and *P. vetulus* differs from all other species of the genus by the dextral position of the cirrus sac and gonopore; this is the first species of *Zoogonus* to be reported from the eastern Pacific. The author states that although Skryabin in 1957 made *Z. mirus* a synonym of *Z. rubellus* there seems to be insufficient evidence in the literature for so doing.  
J. W. Smith

**2400**—DEELMAN, J. J., 1960. "Studies on the genus *Helicometrina* Linton, 1910 (Trematoda: Digenea: Allocreadiidae)." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 13.

Deelman has studied several hundred specimens of *Helicometrina* from a single host species in one locality and has found numerous intergrades between *H. nimia* and *H. elongata*. *H. orientalis* also appears to be intermediate between these two and it is suggested that *H. elongata* and *H. orientalis* should be placed in synonymy with *H. nimia*, the type species. S. Willmott

**2401**—DUBOIS, G., 1959. "Invalidation des Neostrigeidae Bisserru 1956 (Trematoda: Digenea)." *Annales de Parasitologie Humaine et Comparée*, **34** (4), 449–451.

Dubois has examined Bisserru's original material of *Neostrigea africana* and has found it to be identical with *Strigea falconis*. There is no evidence of the presence of a paraprostome in this species or in *N. leiperi* and the arrangement of the genital ducts in the latter is identical with that described for *Strigea*. The family Neostrigeidae is therefore invalidated. S. Willmott

**2402**—DUTT, S. C. & SRIVASTAVA, H. D., 1961. [Division of Parasitology, Indian Veterinary Research Institute, Izatnagar, India.] "A revision of the genus *Ornithobilharzia* Odhner (1912), with the creation of two genera *Orientobilharzia* Dutt and Srivastava (1955) and *Sinobilharzia* Dutt and Srivastava (1955) (Trematoda: Schistosomatidae)." *Indian Journal of Helminthology*, **13** (1), 61–73.

This is the unabridged paper revising the genus *Ornithobilharzia* which was presented to the 42nd Indian Science Congress and of which an authors' abstract appeared in the third volume of the Congress Proceedings published in 1955 [for abstract see *Helm. Abs.*, **24**, No. 623c]. Keys are now given to the ten genera of the subfamily Schistosomatinae and to the three species of *Orientobilharzia* and *Sinobilharzia* erected in 1955 by Dutt & Srivastava. As then emended *Ornithobilharzia* was restricted to avian schistosomes with a much elongated, tubular and loosely spiral ovary and 25 or more testes. [*Orientobilharzia* now given as a new genus, and *Sinobilharzia odhneri* (Faust, 1924) and *Microbilharzia hoepplii* (Tang, 1951) as new combinations had already appeared as such in the 1955 abstract of this paper.] R. T. Leiper

**2403**—ETGES, F. J., 1961. [Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio, U.S.A.] "*Cercaria reynoldsi* n.sp. (Trematoda: Echinostomatoidea) from *Helisoma anceps* (Menke) in Mountain Lake, Virginia." *Transactions of the American Microscopical Society*, **80** (2), 221–226.

*Cercaria reynoldsi* n.sp. from *Helisoma anceps* in Mountain Lake, Virginia, is a massive-tailed, echinostome cercaria bearing a crown of 22 collar spines. It differs from *C. caudadena* and the cercaria of *Petasiger nitidus* in lacking body spines and from *C. magnacauda* and *C. cita*, the two other long-tailed echinostome cercariae with collar spines cited by Lee & Seo in 1959 in *Trans. Amer. micr. Soc.*, **78**, 215–219, in various morphological characters. Experiments failed to reveal the host in or on which the metacercaria encysts. R. T. Leiper

**2404**—FEIZULLAEV, N. A., 1961. [A new trematode, *Cathaemasia skrjabini* n.sp. from *Ciconia ciconia* in Azerbaidzhan.] *Dokladi Akademii Nauk Azerbaidzhanskoi SSR*, **17** (1), 63–65. [In Azerbaijani; Russian summary p. 65.]

*Cathaemasia skrjabini* n.sp. is described and figured from *Ciconia ciconia* in the Lenkoran area of Azerbaidzhan. Eight out of 18 storks examined were infected. *C. skrjabini* differs from all other known species of *Cathaemasia* in that its vitellaria begin at the anterior edge of the genital bursa. G. I. Pozniak

**2405**—FREITAS, J. F. TEIXEIRA DE, 1960. [Instituto Oswaldo Cruz, Rio de Janeiro, Guanabara, Brazil.] "Sobre uma nova espécie do gênero *Prosthodendrium* Dollfus, 1931 (Trematoda, Lecithodendriidae)." *Revista Brasileira de Biologia*, **20** (3), 265–268.

*Prosthodendrium conturbatum* n.sp. is described and figured from the small intestine of *Molossus major crassicaudatus* in Para, Brazil. It is close to *P. ascidia navicula* in that the acetabulum is smaller than the oral sucker. Freitas states that the two species may be distinguished by various measurements and by the relation between the suckers and between the genital glands and the acetabulum. W. M. Fitzsimmons



- 2406**—HOLLIMAN, R. B., 1961. [Florida State University, U.S.A.] "Trematode cercariae from the Apalachee Bay area, with a summary of the literature on marine cercariae of the world." **Dissertation Abstracts**, 21 (9), 28-34.

The original thesis is said to contain new information on *Cercaria caribbea* III, *C. caribbea* XXXVI, *C. purpurea* and *C. quissetensis*; 24 new species of cercariae from marine molluscs of Apalachee Bay, Gulf of Mexico, have been described and figured and have been named by preceding a number with the geographical term, *apalachiensis*. These new species are said to consist of one cyathocotylid, one schistosoma, two aporocotylids, four furcocercous fellodistomatids, one tail-less fellodistomatid, one bucephalid, three echinostomes, one monostome microphallid xiphidiocercaria, one distome plagiorchoid xiphidiocercaria, one cotylocercous monorchiid, one cotylocercous opocoeleid or allocreadiid, one allocreadiid with a long, glandular tail, one leptocercous allocreadiid, three pleurolophocercous heterophyids, one hemiurid and one magnacercous cercaria of unknown affinity. A study of the morphology of certain organs, e.g. the flame cells and the tail of some of these new species, has extended the known structural diversity within their cercarial groups. The thesis is said to include a table summarizing the data pertinent to the 324 known species of marine cercariae and a key to these species based on La Rue's system of classification (1957).

J. W. Smith

- 2407**—HUNTER, W. S. & THOMAS, L. J., 1961. [Duke University, Durham, North Carolina, U.S.A.] "A new species of *Saccacoelium* (Trematoda, Haploporidae) from Beaufort, N.C." **Transactions of the American Microscopical Society**, 80 (2), 176-179.

Hunter & Thomas describe and figure *Saccacoelium beauforti* n.sp. from the small intestine of a small *Mugil cephalus* at Beaufort, North Carolina; none were found in larger mullet. The new species differs from other members of the genus in egg size, the distribution of the vitellaria and the presence of a prominent refractory body within the excretory bladder.

E. I. Sillman

- 2408**—JAIN, G. P., 1960. [Department of Zoology, Mahakoshal Mahavidyala, Jabalpur (M.P.), India.] "On the genus *Artyfechinostomum* (Lane, 1915) (*Echinostomatidae*: Trematoda)." **Parasitology**, 50 (1/2), 1-5.

Jain believes that the genus *Artyfechinostomum* Lane, 1915 should not be treated as a synonym of the genus *Paryphostomum* Dietz, 1909, since the two genera can be differentiated by the number of collar spines and size and location of the cirrus sac. Accordingly he assigns *Artyfechinostomum* to the subfamily Paryphostominae Mendheim, 1943, and transfers *Paryphostomum indicum* Bhalerao, 1931 and *P. mehrai* Jain, 1957 to that genus. Diagnoses of *Paryphostomum* and *Artyfechinostomum*, keys to species of the two genera, tables comparing the principal characteristics of named species, and a short historical review of the taxonomy of the group are presented.

E. I. Sillman

- 2409**—KABATA, Z., 1961. [Marine Laboratory, Aberdeen, Scotland.] "A new genus and species of trematode parasitic in *Macrurus fabricii* (Sundeval), a deep-sea fish." **Proceedings of the Zoological Society of London**, 136 (2), 285-292.

Kabata describes and figures *Bathycreadium flexicollis* n.g., n.sp. (Allocreadiinae) from *Macrurus fabricii*. 20 specimens of the new form together with 18 specimens of *Echinorhynchus gadi* were found in the intestine of a single host. The new genus resembles *Koseira* and *Proenenterum* in having posteriorly united gut caeca; it differs from *Koseira* by not having an anal canal opening to the exterior and from *Proenenterum* by, among other characters, having a smooth cuticle and by having the region between the suckers narrower than the rest of the body which forms a tapering "neck" usually observed in dorsiflexion.

J. W. Smith

- 2410**—KOZICKA, J. & NIEWIADOMSKA, K., 1960. [Zakład Parazytologii, Polska Akademia Nauk, Warszawa, Pasteura 3, Poland.] "Studies on the biology and taxonomy of trematodes of the genus *Tylodelphys* Diesing, 1850 (*Diplostomatidae*)." **Acta Parasitologica Polonica**, 8 (21/32), 379-401. [Polish summary p. 401.]

Kozicka & Niewiadomska have carried out parasite surveys on fishes in, and birds from the environs of, Lakes Drużno, Gołdapiwo, Mamry Połnocne and Arklity (Mazuria) in Poland. This paper is concerned only with species of the genus *Tylodelphys*. *T. conifera* and

*T. podicipina* most commonly infected *Podiceps cristatus*; *P. griseigena* and *P. nigricollis* were less frequently infected. Two *Ciconia ciconia* examined were infected with *T. excavata*. None of 22 *Ardea cinerea* and only two of 13 *Circus aeruginosus* examined were infected with *T. clavata*. Measurements of the specimens of these four species of *Tylodelphys* are in agreement with those given by Dubois [see **Mem. Soc. neuchâtel. Sci. nat.**, 6, 1-535]. Metacercariae of *T. clavata*, which most commonly infected *Perca fluviatilis*, are described and figured and resemble those described by Ciurea; 13 other species of hosts of *T. clavata* are given. Metacercariae of *T. podicipina* were found in *P. fluviatilis*, *Lota lota* and *Acerina cernua*. Metacercariae of *T. cranaria* were found in *Misgurnus fossilis* only. The metacercariae of *T. conifera* were not found in fishes of any lake; 3,695 fishes representing 27 species were examined. Attempts to reproduce Ciurea's experiments [see **Bull. Sect. sci. Acad. roum.**, 11, No. 9/10] of obtaining adult *T. clavata* by feeding *C. aeruginosus* with metacercariae of "*T. clavata*" from the eyes of *P. fluviatilis* were unsuccessful. However, adult *T. conifera* were obtained from *Podiceps cristatus* infected with these metacercariae. Metacercariae of "*T. clavata*" from the eyes of *Carassius carassius* and *Rutilus rutilus* also developed into *T. conifera* when fed to *P. cristatus*. On the basis of these results the trematode which develops from the metacercariae of "*T. clavata*" in various species of *Podiceps* is given the name *T. clavata* (Nordmann, 1832) Diesing, 1850. The trematode which is found in *Circus aeruginosus* in nature, which does not develop from the metacercaria *T. clavata*, is given the name *T. clavata* (Ciurea, 1929) Hughes, 1929 until its metacercaria is found. J. W. Smith

\*2411—LEONOV, V. A., 1957. [New trematodes of fish-eating birds.] **Uchenie Zapiski. Gorkovskii Gosudarstvennyi Pedagogicheskii Institut**, 19, 43-52. [In Russian.]

\*2412—LEONOV, V. A., 1957. [On the specific independence of the trematode *Cercarioidea baylisi* Nasmi, 1930.] **Uchenie Zapiski. Gorkovskii Gosudarstvennyi Pedagogicheskii Institut**, 19, 53-55. [In Russian.]

2413—McCAULEY, J. E. & PRATT, I., 1960. [Oregon State College, Corvallis, U.S.A.] "*Aporchis continuus* n.sp. (Trematoda: Echinostomatidae)." **Journal of Parasitology**, 46 (5), 642-644.

McCauley & Pratt describe and illustrate *Aporchis continuus* n.sp. (Echinostomatidae) from the intestine of *Larus canus* in Oregon. *A. continuus* is close to *A. massiliensis* but lacks the lateral interruptions in the row of marginal spines on the head crown, the notch spines are longer, the marginal ones are uniform in size and arrangement and the eggs are narrower and have shorter filaments. J. W. Smith

2414—MANTER, H. W. & PRITCHARD, M. H., 1960. [University of Nebraska, Lincoln, Nebraska, U.S.A.] "Some digenetic trematodes of eels of Hawaii." **Journal of Parasitology**, 46 (5), 651-658.

One new genus and four new species of digenetic trematodes from six species of eels in Hawaii are described and illustrated by Manter & Pritchard. *Dolichoenterum microtylum* n.sp. [referred to elsewhere in the paper as *D. microcotylum*] was taken from three of 37 *Conger cinereus* examined. The new form differs from all other bucephalids in possessing an oral sucker, but the author states that Tendeiro has indicated (in correspondence) that *D. manteri* also has an inconspicuous oral sucker. It differs from *D. longissimum* in the more anterior mouth, and the more numerous and confluent vitelline follicles. *Helicometra dochmosorchis* n.sp., from one of 19 *Gymnothorax buroensis* examined, resembles *H. pulchella* in its oblique testes but differs from it in the much larger sucker ratio, the greater post-testicular space, the more anterior genital pore and the smaller gonads and eggs. *Helicometrina quadrorchis* n.sp. was found in five of 19 *Gymnothorax buroensis* and one *G. steindachneri* examined. The new species is the only one of the genus possessing four testes. It resembles *Helicometra dochmosorchis* which, however, has only two testes. *Acaenodera placophora* n.g., n.sp., a new acanthocolpid taken from *Conger cinereus*, differs from *Deropristis* in possessing ventral median spines but no trace of peribuccal spines were found. *Opegaster ditrematis* is reported from *Moringua javanica* and *Myrichthys maculosus*. The authors discuss the morphology, especially the absence or presence of body spines, of the genera in the Acanthocolpidae and Deropristinae.

J. W. Smith



- 2415—MARTIN, W. E., 1960. [Biology Department and Hancock Foundation, University of Southern California, California, U.S.A.] "Hawaiian helminths. IV. *Paracardicola hawaiiensis* n.gen., n.sp. (Trematoda: Sanguinicolidae) from the balloon fish, *Tetraodon hispidus* L." **Journal of Parasitology**, 46 (5), 648–650.

Martin found all of 10 *Tetraodon hispidus* examined to be infected with *Paracardicola hawaiiensis* n.gen., n.sp. The new form is described and illustrated; it differs from *Cardicola* and all other genera of fish blood flukes by having two testes and the posterior intestinal caeca reaching the anterior portion of the pre-ovarian testis. As in *Cardicola cardiocolus* the uterine eggs appear to be without shells. The eggs of *P. hawaiiensis* are very numerous in the liver of *Tetraodon hispidus* and must do considerable damage to this organ.

J. W. Smith

- 2416—NASIR, P., 1960. [Department of Zoology and Comparative Physiology, University of Birmingham, England.] "Studies on the life history of *Echinostoma nudicaudatum* n.sp. (Echinostomatidae: Trematoda)." **Journal of Parasitology**, 46 (6), 833–847.

Nasir reared *Echinostomum nudicaudatum* n.sp. in pigeons, from cercariae found in *Lymnaea stagnalis* from Edgbaston Pond, near Birmingham. Cercariae emerging from the snails entered and encysted in the renal organs of species of *Lymnaea*, *Planorbis*, *Paludina*, *Bithynia* and tadpoles. Metacercariae five days to more than 14 months old were infective to pigeons, where the adults established themselves mainly in the cloaca and reached the egg-laying stage in about 14 days. The natural host was not discovered. The miracidium, cercaria and adult are described and figured. Attempts to infect laboratory-bred snails with miracidia were unsuccessful but information from natural infections suggested at least four redial generations. The new species is differentiated from the nine other 37-spined species of the genus by the size and arrangement of the collar spines in the adult and the morphology of the cercaria.

E. I. Sillman

- 2417—ODENING, K., 1959. [Zoologische Forschungsstelle der Deutschen Akademie der Wissenschaften, Berliner Tierpark, Berlin-Friedrichsfelde, Germany.] "Das Exkretionssystem von *Omphalometra* und *Brachycoelium* (Trematoda, Digenea) und die Taxonomie der Unterordnung Plagiorchiata." **Zeitschrift für Parasitenkunde**, 19 (5), 442–457.

Odening describes and illustrates the excretory system of *Omphalometra flexuosa* and *Brachycoelium salamandrae* as revealed by phase-contrast. Both have the same flame cell formula  $2[(3+3+3)+(3+3+3)]$  but they differ in that in *O. flexuosa* the two main tubules on either side enter directly, close to one another, into the terminal ends of the arms of the bladder, while in *B. salamandrae* they enter at the corners of the I-shaped bladder via connecting tubes; the terminal section of these tubes is ciliated; the geographical distribution and ecology of *Omphalometra*, of which *Skrjabinomerus* is a synonym, is discussed. The group of trematodes previously known as Plagiorchioidea (= Lepodermatoidea), Dicrocoelioidea and Plagiorchiidae *sensu lato*, Odening now defines as suborder Plagiorchiata (La Rue, 1957) emended, principally characterized by xiphidiocercariae which develop in sporocysts. He proposes the following scheme for the families based on the mode of junction of the vascular system into the bladder and, as subsidiary characters, the shape of the bladder, the flame cell formula and the position of the testes in relation to the ovary: (i) superfamily Plagiorchioidea emend. containing Plagiorchiidae emend., Pleurogenidae n.fam. (*sensu* Pleurogeninae (Looss)), Lecithodendriidae emend., Brachycoeliidae emend. (*sensu* Brachycoeliinae Dollfus sine *Tremiorchis* (non *sensu* Looss, Johnston) plus Macroderoididae McMullen, *Enstomos*, *Haplometrana* and *Alloglyptus*, and Travtrematinae Goodman), Mesocoeliidae Dollfus, Dicrocoeliidae (*sensu* Dollfus and Skryabin & Erranova), ? Microphallidae Travassos, Viana, ? Stomylotrematidae Poche and ? Lissorchiinae Magath; (ii) superfamily Ochetosomatoidea n.superf. containing Ochetosomatidae Leão, Cymatocarpidae n.fam. (Cymatocarpinae *sensu* Dollfus plus Orchidasmatinae Dollfus), Telorchidae *sensu* Dollfus (non *sensu* Stunkard or Nicoll) and Prosthogonimidae Ward (*sensu* Prosthogoniminae Lühe); and (iii) morphologically isolated or insufficiently described groups: Cephalogonimidae Nicoll, Omphalometridae n.fam. (Omphalometrinae *sensu* Dollfus, Odening (non *sensu* Looss, Travassos, Freitas or Yamaguti), Maseniidae Yamaguti and Gupta, Urotrematidae Poche, Mesotretidae Poche, Ommatobrephidae Poche and ? Heterorchiinae.

G. I. Pozniak

- 2418—ODENING, K., 1960. [Zoologische Forschungsstelle der Deutschen Akademie der Wissenschaften, Berliner Tierpark, Berlin-Friedrichsfelde, Germany.] "Eine neue *Concinnum*-Art (Trematoda: Dicrocoeliidae) aus *Herpestes brachyurus* (Carnivora: Viverridae)." **Biologisches Zentralblatt**, 79 (5), 513-519.

Odening describes and figures (including the excretory system) *Concinnum dathei* n.sp. from the gall-bladder of *Herpestes brachyurus* which died at the Berlin Zoo 17 months after its arrival from Sumatra. The new species is nearest to *C. concinnum*, *C. planicipitis* and *C. ten* but is characterized by: the lancet-shaped body being not more than 3.2 mm. long and 1 mm. wide, the diameter of the oral to that of the ventral sucker being 46 : 73, the pharynx being less than half the diameter of the oral sucker, the gut caeca generally terminating at a point half-way between the transverse vitelline duct and the end of the body and the eggs measuring 0.028 mm. to 0.045 mm.  $\times$  0.017 mm. to 0.030 mm. A key to the species of *Concinnum* is given. G. I. Pozniak

- 2419—OSHMARIN, P. G. & PARUKHIN, A. M., 1960. [Dalnevostochni filial Sibirskogo otdeleniya Akademii nauk SSSR, Vladivostok, U.S.S.R.] [The helminth fauna of *Pandion haliaetus* as an example of how the helminth fauna of animals is formed.] **Zoologicheskii Zhurnal**, 39 (9), 1303-1311. [In Russian: English summary p. 1311.]

An attempt is made to analyse the origin of the helminths of *Pandion haliaetus* in relation to ecological and phylogenetic factors. Eight trematodes, eight nematodes and one acanthocephalan are at present known for this host and it is thought that only *Contracaecum pandioni* shows parallel evolution with the host. *Linstowiella viviparae*, *Porrocaecum angusticollae*, *Physaloptera acuticauda* and *P. alata* are species with a wide range of hosts among the Falconiformes and the remaining 12 species stem from hosts with an aquatic background. The fauna includes a new heterophyid, *Acanthotrema ryjikovi* n.g., n.sp. which is figured and described. *Acanthotrema* [preoccupied by *Acanthotrema* Travassos, 1924, a synonym of *Stictodora* Looss, 1899 according to Witenberg, 1953] belongs in Cryptocotylineae but differs from the other genera of the subfamily in the presence of a ring of spines on the oral sucker. G. I. Pozniak

- 2420—PETERS, L. E., 1961. [Purdue University, Lafayette, Indiana, U.S.A.] "The genus *Skrjabinopsolus* (Trematoda: Digenea), with reference to the allocreadioid problem." **American Midland Naturalist**, 65 (2), 436-445.

Peters considers that the cercariae described by Seitner in 1951 as those of *Allocreadium ictaluri* [for abstract see Helm. Abs., 20, No. 109a] are, in fact, those of *Skrjabinopsolus manteri*, a parasite of the sturgeon. These cercariae are known to encyst in certain fresh-water oligochaetes [no species are named] which are eaten in large numbers by sturgeons. Since sturgeons known to be free from *S. manteri* were not available, feeding experiments with metacercariae were not tried; attempts to infect catfishes, gar, rock bass and mud minnows were unsuccessful. Attempts to infect *Amnicola limosa*, *Campeloma rufum*, *Goniobasis livescens* and *Pleurocera acuta* with embryonated eggs were unsuccessful. Young adult *S. manteri* have an excretory system like that of *Deropristis inflata*. The egg and the miracidium, which has one pair of flame cells and no eye-spot, are described and figured. Seitner's description of the cercaria is supplemented by an illustrated account of the embryology of the excretory system. The primary excretory pores develop in the tail of the cercaria a short distance from the body, which supports the allocation of *Skrjabinopsolus* and related genera to a distinct family, the Deropristiidae. Peters emends the Deropristiidae to include *Deropristis*, *Pristicola* and *Skrjabinopsolus* in the Deropristiinae and *Cestrahelminis* as type and only genus in a new subfamily, the Cestrahelmininae. The author concurs with Skryabin and withholds the classification of *Paratormopsolus* until more is known of the genus. J. W. Smith

- 2421—PETERS, Jr., L. E., 1961. [Purdue University, U.S.A.] "Studies on some digenetic trematodes of fishes with reference to the allocreadioid problem." **Dissertation Abstracts**, 21 (7), 2057.

In the family Acanthocolpidae the primary excretory pores of the cercariae are well removed from the body-tail furrow; for this, and other reasons this family is excluded from the superfamily Allocreadioidea and it is suggested that its closest affinities are with either the Echinostomatoidea or the Opisthorchioidea. The genus *Dihemistephanus* is redefined and



transferred from the Acanthocolpidae to the subfamily Lepocreadiinae of the family Lepocreadiidae; *D. lydiae* is redescribed. The epidermal cell patterns of digenetic trematodes are probably constant for the family and sometimes for the superfamily. The account of the life-history and systematics of *Skrjabinopsolus manteri* has been published more fully in *Amer. Midl. Nat.*, **65**, 436-445 [for abstract see No. 2420 above]. J. W. Smith

**2422**—RAI, S. L. & AGARWAL, S. M., 1961. [Department of Zoology, Mahakoshal Mahavidyala, Jabalpur, India.] "*Paryphostomum giganticum* sp.nov. (Trematoda: Echinostomatidae)." *Indian Journal of Helminthology*, **13** (1), 23-34.

Rai & Agarwal describe and figure *Paryphostomum giganticum* n.sp. from the intestine of *Porphyrio poliocephalus*. *Paryphostomum bubulcusi* and *P. dollfusi* have the collar spines in one row with an end group of three spines on each side, whereas *P. giganticum* has the spines arranged in two rows (the spines of which alternate) with an end group of five spines on each side, of which one spine is larger than the rest. The new species further differs from *P. bubulcusi* and *P. dollfusi* by having cuticular spines in the pre-acetabular zone of the body, by the shape of the testes, by having vitellaria which are confluent, or nearly so, in the post-testicular region of the body and by the large size of the body (from 16.15 mm. to 18.59 mm. in length). The authors regard *Paryphostomum* and *Artyfechinostomum* as two distinct genera. A diagnosis of *Paryphostomum* and a key to the species are given. J. W. Smith

**2423**—STUNKARD, H. W., 1960. [American Museum of Natural History, Central Park West at 79th Street, New York 24, N.Y., U.S.A.] "Studies on the morphology and life-history of *Notocotylus minutus* n.sp., a digenetic trematode from ducks." *Journal of Parasitology*, **46** (6), 803-808, 809.

Stunkard describes and figures the redia, cercaria, metacercaria and adult of *Notocotylus minutus* n.sp. Asexual stages were found in *Hydrobia minuta*, in the region of Boothbay Harbor, Maine (U.S.A.). Encysted metacercariae developed to maturity in a young, laboratory-reared *Somateria mollissima*. There is a brief discussion of the problem of species determination in the genus *Notocotylus*. E. I. Sillman

**2424**—WAITZ, J. A., 1960.—[Department of Zoology, University of Illinois, Urbana, Illinois, U.S.A.] "*Telorchis bonnerensis* n.sp. (Trematoda: Digenea) from the intestine of larval *Ambystoma macrodactylum* Baird, from northern Idaho." *Journal of Parasitology*, **46** (6), 815-817, 818.

Waitz describes *Telorchis bonnerensis* n.sp. from the intestine of larval *Ambystoma macrodactylum* and one *Thamnophis sirtalis* in Idaho. The anterior extent of the vitellaria, the length of the cirrus sac, the position of the ovary, the length of the intestinal caeca, the extreme posterior placement of the testes and the size of its eggs distinguish the new species from all others in the genus. Adult *Ambystoma* did not harbour the parasite. E. I. Sillman

## Cestoda

**2425**—DEBLOCK, S., BIGUET, J. & CAPRON, A., 1960. [Laboratoire de Parasitologie, Faculté mixte de Médecine-Pharmacie, Lille, France.] "Contribution à l'étude des cestodes de Lari des côtes de France. 1. Le genre *Hymenolepis*. Révision des espèces du genre, à propos de trois descriptions dont une nouvelle." *Annales de Parasitologie Humaine et Comparée*, **35** (4), 538-574.

*Hymenolepis charadrii* and *H. lauriei* from *Larus ridibundus* are redescribed. *H. stellorae* n.sp. from *L. ridibundus* in France possesses a small scolex with a diameter of 115  $\mu$  to 130  $\mu$  and hooks measuring 20  $\mu$  to 21  $\mu$  in length with very short handles. The average length of the strobila is about 10 cm., the cirrus pouch measures 130  $\mu$  to 220  $\mu$  by 35  $\mu$  and the cirrus 40  $\mu$  to 50  $\mu$  by 7  $\mu$  to 10  $\mu$ , while the cirrus spines are 2.3  $\mu$  by 2.5  $\mu$ . The external vesicula seminalis is pyriform and the receptaculum seminis tubular, these organs being 125  $\mu$  by 50  $\mu$  and 175  $\mu$  by 35  $\mu$  respectively. *H. stellorae* differs from *H. cirrosa* in the length of the hooks, in having a short cirrus with spines restricted to the base and in having a short vagina. The hooks of *H. cirrosa* measure 22.5  $\mu$  in length, the cirrus is over 500  $\mu$  and is covered with minute spines. A discussion includes a critical review of members of *Hymenolepis* found in gulls and the authors state that 15 or 16 valid members of the genus occur in these birds. A key is given for 15 species. H. H. Williams

**2426**—KORPACZEWSKA, W., 1960. [Katedra Zoologii, S.G.G.W., Warszawa, Rakowiecka 8, Poland.] "Some reflections on *Hymenolepis furcifera* Krabbe 1869 and related species." *Acta Parasitologica Polonica*, **8** (21/32), 461–470. [Polish summary p. 470.]

Korpaczewska has carried out detailed studies of 1,426 specimens of *Hymenolepis furcifera* from *Podiceps cristatus* and *P. griseigena*. The author found a wide range of individual variation in the shape and dimensions of hooks and in the ratio of the length of the cirrus bursa to the width of the proglottis. She compares the data on *H. furcifera*, *H. furcigera*, *H. capillaris* and *H. podicipina* as given by various authors; in view of the wide range of intra-specific variation in *H. furcifera* the author considers *H. capillaris* and *H. podicipina* to be synonyms of *H. furcifera*. *H. furcigera* Krabbe, 1869 as described by Joyeux & Baer, 1950 is considered by Korpaczewska to be identical with *H. furcifera* Krabbe, 1869 and assumes that the substitution of one letter in the specific name was due to an error on the part of either the editor or the authors.

J. W. Smith

**2427**—McCRAE, R. C., 1961. [Colorado State University, U.S.A.] "Studies on the Caryophyllaeidae (Cestoda) of the white sucker, *Catostomus commersoni* (Lacepede) in northern Colorado." *Dissertation Abstracts*, **21** (9), 2835–2836.

*Biacetabulum biloculoides* n.sp., *B. macrocephalus* n.sp., *Glaridacris catostomi*, *G. oligorchis* and *Hunterella nodulosa* n.g., n.sp. were found in *Catostomus commersonii* from North Colorado; the new species are described in the original thesis. It is said that the thesis contains new morphological data on *G. catostomi* and *G. oligorchis*, descriptions of the egg, embryo, larva and immature stages of *G. catostomi*, *G. oligorchis* and *H. nodulosa*, and keys to the genera of the Caryophyllaeidae and species of *Biacetabulum* and *Glaridacris*. The patterns of development of *G. catostomi*, *G. oligorchis* and *H. nodulosa*, which have been studied experimentally, are nearly identical. Embryonation is complete from 10 to 22 days after passage of the egg in the host's faeces; the ciliated embryo hatches on ingestion by *Limnodrilus udekemianus*. Although experimental infection was unsuccessful it is thought that the white sucker becomes infected by eating infected *L. udekemianus*. The caryophyllaeid life-cycle is considered to be a fourth type distinct from the cyclophyllidean, pseudophyllidean and protocephalid types. *Szidatinus* replaces *Brachyurus* Szidat, 1938 which is preoccupied.

J. W. Smith

**2428**—METTRICK, D. F., 1960. [Department of Zoology, University College of Rhodesia & Nyasaland, Salisbury, Southern Rhodesia.] "A new cestode, *Ophiotaenia ophiodes* n.sp., from a night-adder, *Causus rhombeatus* (Licht.), in Southern Rhodesia." *Proceedings of the Helminthological Society of Washington*, **27** (3), 275–278.

Mettrick states that *Ophiotaenia ophiodes* n.sp. from the hind gut of a night adder, *Causus rhombeatus*, falls into Wardle & McLeod's Species Group VI. It differs from the 19 species already included in this group in having 110 to 120 testes, a cirrus sac measuring 0.19 mm. to 0.20 mm. long by 0.12 mm. to 0.13 mm. wide, a genital pore opening slightly posterior to the equatorial level of the segment and a uterus with 30 to 42 branches on either side of a median stem.

H. H. Williams

**\*2429**—MOROZOV, Y. F., 1957. [Three new hymenolepidids from *Sorex*.] *Uchenie Zapiski. Gorkovski Gosudarstvenni Pedagogicheski Institut*, **19**, 35–42. [In Russian.]

**2430**—REGO, A. A., 1960. "Nota prévia sobre uma nova espécie do gênero *Monoecocestus* Beddard, 1914 (Cestoda, Cyclophyllidae)." *Atas da Sociedade de Biologia do Rio de Janeiro*, **4** (5), 67–68.

*Monoecocestus parcitesticulatus* n.sp. is described from the small intestine of *Cavia porcellus* (type host) and *C. aperea* from Guanabara, Brazil. The new species is closest to *M. anoplocephaloides* and *M. sigmodontis* from which it is distinguishable by the length (59.96 mm. to 63.65 mm.), the number of proglottides (150 to 200), the dimensions of the scolex (0.514 mm. long by 0.597 mm. broad), the dimensions of the cirrus sac (pear-shaped, length 0.382 mm., width 0.278 mm. and 0.087 mm. in mature but not gravid segments), and by the number (30 to 50) and disposition of the testes (three to four rows in the posterior part of the segment down to one row at the level of the vitellarium).

W. M. Fitzsimmons



- 2431**—REGO, A. A., 1960. "Nota prévia sobre um novo *Monoecocestus* parasito de preá (Cestoda, Cyclophyllidea)." *Atas da Sociedade de Biologia do Rio de Janeiro*, **4** (6), 73–74.  
*Monoecocestus minor* n.sp., from the small intestine of *Cavia aperea*, is closest to *M. anoplocephaloides* from which it is distinguished by its length (8.37 mm. to 15.41 mm. long), the size of its scolex (0.244 mm. long  $\times$  0.392 mm. wide) and the width of the cirrus sac (0.113 mm. wide in mature segments) but chiefly by the number (approximately 50 to 80) and distribution of the testes (chiefly in the posterior part but sometimes also in the dorsal part of the proglottis).  
W. M. Fitzsimmons

**\*2432**—SHALDIBIN, L. S., 1957. [A new cestode from insectivores.] *Uchenie Zapiski. Gorkovskii Gosudarstvennyi Pedagogicheskii Institut*, **19**, 71–72. [In Russian.]

**2433**—WAITZ, J. A. & MEHRA, K. N., 1960. "A new nematotaeniid from the salamander, *Plethodon vandykei*, from northern Idaho." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 17–18.

A new (unnamed) species of *Baerietta* was recovered from the intestine of *Plethodon vandykei idahoensis*. The specimens differ from the five other members of the genus in diameter, size of suckers, constriction of the neck region, size of the uterus and number of eggs.

S. Willmott

### Acanthocephala

**2434**—MACHADO F., D. A., 1959. "Echinorhynchidae do Brasil. II. Nova espécie do gênero *Echinorhynchus* Zoega in Müller, 1776." *Memorias do Instituto Oswaldo Cruz*, **57** (2), 195–198.  
*Echinorhynchus paranensis* n.sp. is described and figured from the intestine of *Triportheus paranensis* from the State of Mato Grosso, Brazil. The new species is most closely related to *E. salobrensis*. Comparative data for the six Brazilian species of *Echinorhynchus*, *E. jucundus*, *E. briconi* nom. nov. (for *E. gracilis* Machado Filho, 1948), *E. salobrensis*, *E. gomesi*, *E. impudicus* and *E. paranensis* are given in a table.  
S. Willmott

**2435**—MACHADO F., D. A., 1959. [Instituto Oswaldo Cruz, Rio de Janeiro, D.F., Brazil.] "Uma nova espécie do gênero *Neoechinorhynchus* Hamann, 1892 parasita de peixe-martin do Paraguai (Neoechinorhynchidae, Archiacanthocephala)." *Revista Brasileira de Biologia*, **19** (4), 379–381.  
Machado Filho describes *Neoechinorhynchus paraguayensis* n.sp. from the intestine of a "peixe-martin" from the Rio Paraguay, Paraguay. This parasite differs from all the other species in the genus primarily on the basis of the size and arrangement of the hooks. In *N. paraguayensis* the anterior circle of hooks is considerably separated from and larger than the two basal circles. The lemnisci are very small, one-third of the length of the proboscis receptacle in the male and twice the length of the receptacle in the female. The internal organs are all much reduced and the proboscis usually remains partially retracted. [Assignment of the family Neoechinorhynchidae to the Archiacanthocephala in the title is unexplained.]  
W. L. Bullock

### Nematoda

**2436**—ANDRÁSSY, I., 1959. [Institut für Tiersystematik Budapest, Hungary.] "Taxonomische Übersicht der Dorylaimen (Nematoda). I." *Acta Zoologica. Budapest*, **5** (3/4), 191–240.  
Of the 401 species and forms of *Dorylaimus* described until now, 300 are regarded as valid species, 79 as synonyms, five as *nomina nuda* and *lapsus* and 17 as *species inquirendae*. A key is given to the genera of Dorylaiminae. Four of the new genera in the key (*Lordellonema*, *Meylonema*, *Amphidorylaimus* and *Thorneela*) are characterized in Part II [for abstract see No. 2437 below]. Keys to all the species of the new genera are given. *Thornenema* n.g. is characterized by an unpaired post-vulvar ovary, long tail and the absence of males; six species are included, with *T. lissum* (Thorne, 1939) n.comb. as type species. *Prodorylaimus* n.g. differs from *Thornenema* in the presence of males, paired ovaries, double spear ring and broader head. *P. longicaudatus* (Bütschli, 1874) n.comb. is the type species and three other species are included. The chief characteristics of *Dorylaimus* sensu stricto are the large size, prominent cuticular pores, heavy spear, double spear ring, paired ovaries, long male pre-rectum,

numerous and close pre-anal supplements, etc. *D. tepidus* n.sp. and *D. wilhelmschneideri* n.sp. are briefly characterized in a key to the 45 species and are described in Part II. *Mesodorylaimus* n.g. differs from *Dorylaimus* in the small size, weakly developed pores, lack of longitudinal striation, reduced spear guide, short male pre-rectum, etc.; 38 species are recognized, with *M. mesonyctius* (Kreis, 1930) n.comb. as type. *Eudorylaimus* n.g. is especially characterized by a simple spear guide, offset head, short male pre-rectum, separated pre-anal supplements, relatively short tails, etc.; 135 species are included, with *E. carteri* (Bastian, 1865) n.comb. as type. New species described in Part II are: *E. humilior* n.sp., *E. tarkönensis* n.sp., *E. maritus* n.sp. and *E. lautus* n.sp.; *E. henrici* is a new name for *D. graciloides* var. *longicaudatus* non *D. longicaudatus*. [Because of the very large number of species involved it is impossible to list each new combination individually.] R. W. Timm

**2437**—ANDRÁSSY, I., 1960. [Institut für Tiersystematik der Universität, Budapest, Hungary.] "Taxonomische übersicht der Dorylaimen (Nematoda). II." *Acta Zoologica. Budapest*, **6** (1/2), 1–28.

Andrássy continues his revision of the subfamily Dorylaiminae [for abstract of Part I see No. 2436 above]. Four new genera already named and well characterized in the previous paper in an analytical key to the genera are set up and the species are presented in key form together with their measurements. *Lordellonema* n.g. is characterized by the presence of two rows of prominent conical pores on the lateral and ventral sides, running the full length of the body, and by scale-like markings on the posterior of the body. *L. bauruense* n.comb. (for *Dorylaimus bauruensis*) is the type and only species. In *Meylonema* n.g. the body is very small, the ovary prevulvar, the head set off in the form of a cap, the spear guiding ring simple, and the spear weakly developed. *M. buchneri* n.comb. (for *D. buchneri*) is the type and only species. *Amphidorylaimus* n.g. differs from *Prodorylaimus* Andrassy, 1959 in the small number of separated pre-anal organs and in the presence of a gubernaculum. *A. infecundus* n.comb. (for *D. infecundus* Thorne & Swanger, 1936) is the type species; *A. congoensis* nom.nov. is a new name for *Dorylaimus infecundus* of Schuurmans Stekhoven & Teunissen, 1938 *nec* Thorne & Swanger, 1936. *Thorneella* n.g. differs from *Thornia* Meyl, 1954 in its oval amphids and dorylaimoid spicules without gubernaculum but with lateral accessory pieces. *T. teres* n.comb. (for *D. teres*) is the type species; *T. aculeata* n.comb. for *D. aculeatus* is also included. Former *Dorylaimus* species transferred to other genera are: *Actinolaimoides homalopapillatus* n.comb., *Antholaimus demani* n.comb., *Aporcelaimus nivalis* n.comb., *Dorylaimoides paesleri* nom.nov. for *Dorylaimus annulatus* Paesler, 1941 *nec* *D. annulatus* Daday, 1905, *Labronema bathybium* n.comb. for *D. bathybius*, *L. corii* n.comb., *L. robustum* n.comb. for *D. robustus*, *Nygolaimus graciloides* n.comb., *N. luganensis* n.comb., *Oxydirus denticaudatus* n.comb., *O. japonicus* n.comb., *O. leptus* n.comb., *O. tambo* n.comb., *Pungentus minnsi* n.comb., and *P. styliidens* n.comb. *Dorylaimus brigdanmensis* is regarded as a *species incertae sedis*. The following species are considered to be *species inquirendae*: *D. bastiani* var. *longicaudatus*, *D. carteri* var. *brevicaudatus* f. typ. sf. *acuticauda* ssf. *steineri*, *D. fasciatus*, *D. filiformis* var. *protumidus*, *D. filiformis* var. *steineri*, *D. giardi*, *D. incertus*, *D. minimus* var. *longus*, *D. obtusicaudatus* var. *alpatovi*, *D. pachydermis*, *D. pachysoma*, *D. puchaussuensis*, *D. stagnalis* var. *menopapillatus*, *B. stagnalis fecundus* var. *bukovinensis*, *D. stagnalis fecundus* var. *paucipapillatus*, *D. viscosus* and *D. zschokkei*. As a late addition to the manuscript two *Dorylaimus* species of Williams, 1959 are classified as *Mesodorylaimus flagellatus* n.comb. and *Thornenema sylphoides* n.comb. The new species briefly described by Andrassy in the first part of his paper are further characterized and figures are given. The paper concludes with an alphabetical list of all *Dorylaimus* species and their new placements. R. W. Timm

**2438**—BABERO, B. B. & THOMAS, L. J., 1960. [Department of Zoology, University of Illinois, Urbana, Illinois, U.S.A.] "A record of *Pharurus oserskaiae* [oserskaiae] (Skrjabin, 1942) in an Alaskan whale." *Journal of Parasitology*, **46** (6), 726.

*Pharurus oserskaiae* is recorded from *Delphinapterus leucas* in the sea off Kotzebue, Alaska. The systematics of pseudaliid nematodes is discussed and it is considered probable that the genera *Otophocaenurus*, *Torynurus* and *Pharurus* are synonyms and that *Pharurus* is distinct from *Stenurus*. W. M. Fitzsimmons



**2439**—FREITAS, J. F. TEIXEIRA DE & MACHADO DE MENDONÇA, J., 1960. "Novo nematódeo parasito de *Procyon cancrivorus* Cuv.: *Pearsonema pearsoni* gen.nov., sp.nov. (Trichuroidea, Capillariidae)." *Atas de Sociedade de Biologia do Rio de Janeiro*, 4 (5), 63–66.

*Pearsonema* n.g. is defined and is distinguished from the genus *Capillaria* chiefly by the terminal and ventrally directed caudal bursa. The type species is *P. pearsoni* n.sp. from the bladder of *Procyon cancrivorus* in Brazil. The following species of *Capillaria* are transferred to the new genus: *C. felis-cati*, *C. linsi*, *C. inflexa* and *C. ransomia*. *P. pearsoni* is closest to *P. linsi* n.comb. from which it differs in having a shorter spicule (1.0 mm. to 1.07 mm. long) and in the arrangement of the caudal papillae in the male (one pair on the latero-dorsal lobes within the bursa).  
W. M. Fitzsimmons

**2440**—GERLACH, S. A., 1957. [Zoologisches Institut der Universität Kiel, Schleswig-Holstein, Germany.] "Die Nematodenfauna des Sandstrandes an der Küste von Mittelbrasilien. (Brasilianische Meeres-Nematoden IV)." *Mitteilungen aus dem Zoologischen Museum in Berlin*, 33 (2), 411–459.

Gerlach discusses the ecological characteristics of the different habitats from which collections were made, and in four tables at the end of the article he lists all the species found in relation to the different zones. In the systematic portion four new genera are described. *Assia* n.g. of the Halaphanolaimidae resembles *Anonchus* in stomatal structure but differs in its circular amphids and in the absence of cuticular pores and pre-anal supplements. *Assia laureata* n.sp. is the type species. *Manunema* n.g. of the Halaphanolaimidae has a very constricted proboscis-like anterior. *M. proboscidis* n.sp. is the type species. *Ingenia* n.g. of the Tripyloididae has a large undivided stoma with a dorsal tooth in addition to smaller teeth. *I. mirabilis* n.sp. is the type species. *Elzalia* n.g. of the Monhysteridae has a deep cuticularized stoma. *E. floresi* n.sp. is the type species. The other new species are: *Oxystomina acuta* n.sp., *Trefusia conica* n.sp., *Barbonema flagrum* n.sp., *Phanodermopsis necta* n.sp., *Enoploides brunettii* var. *vectis* n.var., *Enoplolaimus distortus* n.sp., *Mesacanthion rigens* n.sp., *M. proximum* n.sp., *Oncholaimus manilius* n.sp., *Pontonema ardens* n.sp., *Calyptonema pigmentatum* n.sp., *Paracanthonchus cochlearis* n.sp., *P. batidus* n.sp., *P. digitatus* n.sp., *Paracyatholaimoides serpens* n.sp., *Troglolaimus forceps* n.sp., *Selachinema acanthum* n.sp., *Nannolaimus complicatus* n.sp., *Sabatieria rota* n.sp., *Neotonchus compactus* n.sp., *Prochromadorella spinosa* n.sp., *Microilaimus formosus* [nomen nudum Gerlach, 1956] n.sp., *M. spinosus* n.sp., *Monoposthia ilhabelae* n.sp., *Meta-chromadora spectans* n.sp., *Drepanonema lugubre* n.sp., *Bathepsilonema bahiae* n.sp., *Axonolaimus procerus* n.sp., *Odontophora urothrix* n.sp., *Ceramonema rectum* n.sp., *C. filum* n.sp., *Dasynemella cincta* n.sp., *Dasynemoides cristata* n.sp., *D. lata* n.sp., *Nannonchus amazonicus* n.sp., *Paralinhomoeus conspicuus* n.sp., *Theristus stranus* n.sp., *T. heterus* n.sp., *Steineria pavo* n.sp., *S. tripartita* n.sp. and *Omicronema clavulatum* n.sp.  
R. W. Timm

**2441**—GERLACH, S. A., 1959. [Zoologisches Institut der Universität, Kiel, West Germany.] "Drei neue Nematoden aus dem Küstengrundwasser der Insel Abd el-Kuri (Golf von Aden)." *Zoologischer Anzeiger*, 163 (11/12), 360–364.

Three new species of free-living marine nematodes collected on the Xarifa Expedition 1957–58 are described and figured. *Platycomopsis africanus* n.sp. is very close to *P. curiosus* but differs in the form of the male amphids and the unswollen distal end of the spicules. *Lauratonema spiculifer* n.sp. is near to *L. reductum* but differs in the presence of strongly developed spicules with a gubernaculum. *Enoplolaimus kuri* n.sp. is near to *E. enoploidiformis* but in the female the tail tip is 35% of the anal body diameter and in the male a pre-anal supplement is present.  
R. W. Timm

**2442**—GONÇALVES DA COSTA, S. C., 1960. "Sobre um novo gênero da família Cobboldinidae Skrjabin, 1948 (Nematoda)." *Atas da Sociedade de Biologia do Rio de Janeiro*, 4 (5), 62–63.

*Klossiella* n.g. is erected for *Monhysterides iheringi* and for *M. testudinicola*. The new genus is defined and *Monhysterides* is redefined in its new sense. The main differences are in the structure of the lips, in the presence of a gubernaculum in *Klossiella* and its absence in *Monhysterides*, and in the oesophagus, both parts of which are of a "cellular" nature in *Klossiella* whereas in *Monhysterides* the anterior part is muscular and the posterior part glandular.  
W. M. Fitzsimmons

- 2443—HOPPER, B. E., 1961. [Nematology Section, Entomology Research Institute, Research Branch, Canada Department of Agriculture, Ottawa, Canada.] "*Swangeria bisexualis* n.sp. (Belondiridae: Nematoda) from Florida." **Canadian Journal of Zoology**, 39 (1), 69–72.

Hopper describes and figures *Swangeria bisexualis* n.sp. from swampy soil about the roots of grasses in Florida. The general body shape of both sexes is similar, being long and slender,  $L=2$  mm., tapering anteriorly to a hemispherical head which is not offset. The spear is slender,  $8.4\mu$  long, with an extension about  $12\mu$  long. A sheath of six conspicuous spiral muscles surrounds the basal enlargement of the oesophagus, which is decreased in length but increased in width when the muscles contract. The body narrows rather sharply from the anus and is drawn out into an elongated filiform tail. *S. bisexualis* differs from the type and only other species, *S. fragilis* Thorne, 1939, in having tulip-shaped amphids with distinct apertures, a spear extension longer than the spear, a pronounced body constriction behind the anus and the body twice the length. D. J. Hooper

- 2444—LORDELLO, L. G. E. & ZAMITH, A. P. L., 1960. [Escola Superior de Agricultura "Luiz de Queiroz", Piracicaba, São Paulo, Brazil.] "*Meloidogyne coffeicola* sp.n., a pest of coffee trees in the State of Paraná, Brazil. (Nematoda, Heteroderidae)." **Revista Brasileira de Biologia**, 20 (4), 375–379.

*Meloidogyne coffeicola* n.sp. attacks *Coffea arabica* in Brazil and is said often to cause the death of trees, being a more serious parasite than *M. exigua*. The females are long-necked and brownish and are found in cavities of the roots. The perineal pattern differs from that of other species in being formed from smooth striae encircling the tail tip and continuing between the anus and vulva; the lateral fields are very poorly defined. In general shape the pattern resembles that of *M. brevicauda*. Infective larvae have areolated lateral fields and phasmids half-way along the tail. The lateral fields in males are also areolated and the phasmids are pre-anal. This species is considered to be native to the area in which it was found. M. T. Franklin

- 2445—MITSKEVICH, V. Y., 1960. [Leningradski veterinarnii institut, U.S.S.R.] [*Elaphostrongylus rangiferi* n.sp. in deer.] **Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR**, 12, pp. 115–119. [In Russian.]

[An earlier description of this species appeared in 1958; for abstract see Helm Abs., 27, No. 113a.]

- 2446—MYERS, B. J., 1961. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Helminth parasites of reptiles, birds, and mammals of Egypt. VI. *Dentostomella kuntzi* n.sp., a new oxyurid nematode from *Acomys* spp." **Canadian Journal of Zoology**, 39 (1), 55–57.

*Dentostomella kuntzi* n.sp. from the large intestine of the rodents *Acomys russatus* (type host) and *A. cahirinus* in Egypt (type locality) is described and figures. It differs from the type and only other species of the genus, *D. translucida*, "in total size and in the presence of a marked cephalic inflation and of only three teeth on each of the oesophageal sectors; in the male the bursa is composed of a single lobe which terminates slightly posterior to the last pair of postanal papillae and all, with the exception of the last pair of postanal papillae, are found on raised protuberances; the spicule terminates in a hook". W. M. Fitzsimmons

- 2447—OSCHE, G., 1960. [Zoologisches Institut der Universität, Erlangen, West Germany.] "Systematische, morphologische und parasitophyletische Studien an parasitischen Oxyuroidea (Nematoda) exotischer Diplopoden. (Ein Beitrag zur Morphologie des Sexualdimorphismus)." **Zoologische Jahrbücher. Abteilung für Systematik, Ökologie und Geographie der Tiere**, 87 (4/5), 395–440.

*Thelastoma dollfusi* n.sp., from a diplopod of the Spirostreptinae collected in Tanganyika, and *Cephalobellus skaipei* n.sp. from *Chersastus* sp., a spirobalid diplopod from Cape Town (South Africa), are described. *Bruntpaemilius sclerophorus* is redescribed from a diplopod collected in Tanganyika. A species of *Thelastoma*, either *T. pachyuli* or *T. pteroton*, is described from an unknown location in South America. With these specimens and a review of the literature, Osche established that the corpus intima of the oesophagus of the Rhigonematidae is strengthened by the formation of longitudinal ridges through the fusion of the transverse ridges. The valve apparatus of this family was found to consist of 21 single pieces arranged



in five stages that may be homologized with other nematodes. The mouth cavity of *Brumptaemilius* has a pinnate metastom in addition to the three primitive tooth groups. Fixed and unfixed secondary sexual structures are characterized and their unusual patterns of presence and absence in each sex of related species is discussed in terms of ontogenetic and phylogenetic development. The fusion and loss of lips and head papillae, and the development of cup-shaped suckers, roseate anal papillae, and thorn-like anal papillae in the Oxyuroidea is compared with other superfamilies in the Ascaridina. A tabulation of host groups shows that the Rhigonematidae are exclusively parasitic in the Diplopoda, Thelastomatidae in the Diplopoda and Insecta (mainly Orthoptera but also a few Coleoptera, Diptera and Lepidoptera), while the Hystrignathidae are limited to passalid and hydrophilid beetles. Limited zoogeographical evidence shows a close relation between diplopod and oxyuroid distribution in Africa and South America, a fact indicating the great age of their relation. H. E. Welch

- 2448**—PARUKHIN, A. M. & OSHMARIN, P. G., 1960. [Dalnevostochni filial Sibirskogo otdeleniya Akademii nauk SSSR, Vladivostok, U.S.S.R.] [*Encephalonema longimicrofilaria* n.g., n.sp. from the brain of birds.] *Zoologicheskii Zhurnal*, **39** (6), 934–936. [In Russian: English summary p. 936.] *Encephalonema longimicrofilaria* n.g., n.sp. is described and figured from three females found in the brain of *Pandion haliaetus* in the Primorsk region. The worms measure 5.8 mm. to 6.0 mm. in length and each is a cuticulo-muscular sac with an ovary and uterus which contains microfilariae 1.1 mm. in length. There are six oral papillae but an oral opening, digestive tract and gonopore are absent. The new genus belongs in Filariata but in the absence of males cannot be assigned to a family. G. I. Pozniak

- 2449**—PETTER, A. J., 1959. [Institut de Parasitologie de la Faculté de Médecine de Paris, France.] "Redescription of *Paryseria adeliae* Johnston 1938. Remarques sur le genre *Paryseria* et les genres voisins *Rusguniella*, *Aviculariella*, *Proyseria* (gen.nov.), *Seuratia*." *Annales de Parasitologie Humaine et Comparée*, **34** (3), 322–330. *Paryseria*, erected by Johnston in 1938 for *P. adeliae* from *Pygoscelis adeliae*, was subsequently regarded as a synonym of *Stegophorus* Wehr, 1934 by Johnston & Mawson in 1945, when they describe a second species from *P. adeliae*, namely *S. paradeliae*. Petter regards these two species as synonymous but re-establishes *Paryseria* and gives a detailed redescription of *P. adeliae* based on several females and one male recovered from *Pygoscelis papua*. *Proyseria* n.g. is made for *Rusguniella decora* (Dujardin, 1845) *sensu* Chabaud, 1953. Diagnoses are given for *Rusguniella*, *Aviculariella*, *Proyseria*, *Paryseria* and *Seuratia*, five genera which form an evolutionary series with increasing complexity of the cuticular ornamentation. S. Willmott

- 2450**—SARWAR, M. M., 1960. [Chadda Building, Khawja Dil Mohammad Road, Lahore, West Pakistan.] "Notes on some trichurids." *Biologia. Lahore*, **6** (2), 140–162. Sarwar redescribes *Trichuris trichiura*, *T. hystricis*, *T. mettami*, *T. peramelis*, *T. marsupialis*, *Rudolphia vulpis*, *Buckleyuris cervicapra* and *B. ovis*. *B. ezzati* n.sp. is described from a giraffe. In the new species the spines on both the bulb and shaft of the spicular sheath are uniformly dense whereas in *B. globulosa*, which it closely resembles, they are rather sparse. The size of the spicule and spicular sheath and the shape of the vagina also differ. M. M. Sarwar

- 2451**—VERSTER, A., 1960. [Onderstepoort Laboratory, South Africa.] "Trichuris species from South African rodents and a hyracoid." *Onderstepoort Journal of Veterinary Research*, **28** (3), 465–471. *Trichuris vondweii* Ortlepp, 1938 and *T. parvispicularis* Clapham, 1943, are considered synonymous on the basis of the relative proportions of the male genital system. Three new forms are described: *T. mastomysaei* n.sp. from *Mastomys natalensis* differs from *T. muris* in having a shorter spicule and vagina and in that the vagina is about the same length as the cloaca; *T. pedetei* n.sp. from *Pedetes cafer* can be distinguished from *T. vondweii* in that the cloaca is longer than the ejaculatory duct and the vagina is shorter and in that the eggs are smaller; *T. procaviae* n.sp. from *Procavia capensis* differs from *T. hyracis* in that the anus of the female is not covered by a circular fold. A. Verster

- 2452—ZAJÍČEK, D. & VALENTA, Z., 1958. [Státní vědecký veterinární ústav, Prague, Czechoslovakia.] "Příspěvek k poznání střevních helmintů dovážených opic rodu *Macacus*, jejich patogenity a vztahů k helmintům člověka." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, 31 (6), 397-424; (10), 817-828. [English & Russian summaries pp. 827-828.]

At autopsies of 130 *Macacus* belonging to three species, *M. rhesus*, *M. cynomolgus* and *M. irus*, imported into Czechoslovakia, 22 helminth species were collected. *Filaria* (sensu lato) *longispicularis* n.sp. from *M. rhesus* and *M. cynomolgus* had the following characters [but is not provided with a differential diagnosis]: the male is 70.5 mm. to 132 mm. in length with a conical tip to the tail which has small cuticular alae; there are eight pairs of pre-anal papillae, one pair of ad-anals and three pairs of post-anals and some laterally placed papillae in front of the pre-anals; the right spicule measures 0.168 mm. to 0.196 mm. with a small notch and its point turns towards the base of the spicule; both spicules end distally in rounded spear-heads; a gubernaculum is absent; the left spicule is 7 mm. in length and has a handle-like structure at its base and an oblong widening 1.766 mm. from it; the worms were located in the serous tissues in the lumbar region near the kidneys and suprarenals and in the serous membranes of the abdominal and thoracic cavities; no complete specimens of females were collected. The other helminths identified were: from *Macacus rhesus*, *M. cynomolgus* and *M. irus*, *Oesophagostomum bifurcum*, *Trichostrongylus colubriformis*, *Trichuris trichiura* and *Strongyloides* sp.; from *M. rhesus* and *M. cynomolgus*, *Characostomum asmilium*, *Physaloptera tumefaciens*, *Gongylonema macrogubernaculum*, *Streptopharagus armatus*, *Nochtiya nochti* and *Phaneropsolus* sp.; from *M. rhesus* only, *Abbreviata caucasica*, *Bertiella studeri*, *Capillaria* sp., *Gastrodiscoides hominis*, *Hymenolepis* sp., *Plagiorchis multiglandularis*, *Subulura malayensis* and *Watsonius macaci*; from *M. cynomolgus* only, *Paragonimus westermani*; from *M. irus* only, *Spelotrema brevicaca* and *Pygidiopsis summa*. The following were recorded for the first time from *Macacus*: *Spelotrema brevicaca*, *Pygidiopsis summa*, *Plagiorchis multiglandularis* and *Hymenolepis* sp.

N. Jones

## Hirudinea

- 2453—BAUGH, S. C., 1960. [University of Lucknow, Lucknow, India.] "Studies on Indian rhynchobdellid leeches. 1." **Parasitology**, 50 (3/4), 287-301.

This paper deals with four Indian glossiphonid leeches of which three are new species: *Placobdella horai* n.sp. resembles *P. fulva* in the dorsal pattern but has numerous papillae on the dorsal surface and the gonopores are situated two annuli further forward; *Hemiclepsis bhatiai* n.sp. can be distinguished from *H. viridis* as there are no papillae on the body, the second pair of eyes are the largest of the three pairs and the gonopores are one and a half annuli apart; *Batracobdella hardingi* n.sp. has three pairs of eyes and only 70 annuli [and is based on a single specimen]. The fourth species described is *Glossiphonia heteroclita*. This is the first record of its occurrence in India as the form previously identified has been shown by Moore (1924) to be *Placobdella ceylanica* Harding (1909). The four species are figured and keys are provided for the Indian species of the genera to which they belong.

R. T. Leiper

- 2454—CABALLERO y C., E., 1959. [Del Instituto de Biología, Mexico.] "Hirudíneos de México. XXII. Taxa y nomenclatura de la clase Hirudinea, hasta géneros. (Nueva edición)." **Anales del Instituto de Biología. Mexico**, 30 (1/2), 227-242. [English summary pp. 240-241.]

The terminology used in the catalogue of Mexican leeches published in 1956 by Caballero has been revised and the following genera of Sciacchitano, 1939, are now considered to be synonyms, *Dundjibdella* of *Batracobdella*, *Bakedebdella* of *Helobdella* and *Dartevellida* of *Theromyzon*. *Ichthyobdella* Blainville, 1827 is a synonym of *Piscicola* Blainville, 1818. A number of new synonyms are added to the family Hirudidae Pinto, 1921. *Nematobdella* and *Scaptobdella* are now synonymized with *Herpobdelloidea* and *Trocheta* respectively. *Cymatobranchus* Selensky, 1931 is added to the list of *nomina nuda* as the author has failed to publish a differential diagnosis.

R. T. Leiper



- 2455**—DE SILVA, P. H. D. H. & BURDON-JONES, C., 1961. [Colombo National Museum, Colombo, Ceylon.] "A new genus and species of leech parasitic on the fish *Cottus bubalis*." **Proceedings of the Zoological Society of London**, **136** (3), 343–357.

Attached to the fin-rays of a single *Cottus bubalis* collected on the south coast of Holyhead Island, Anglesey, there were five specimens of *Sanguinothus pinnarum* n.g., n.sp. Like *Platybdella anarrhichae* it has a very reduced coelomic system but differs notably from *Platybdella* in the complete separation from one another of the long posterior pair of crop caeca; it resembles *Abranchus* in the pattern of fusion between ganglia and the nervous system. To indicate its intermediate position between these two genera it is placed in a new genus *Sanguinothus*.  
R. T. Leiper

- 2456**—DE SILVA, P. H. D. H. & KABATA, Z., 1961. [Colombo National Museum, Ceylon.] "A new genus and species of leech parasitic on *Drepanopsetta platessoides* (Malm) the long rough dab." **Proceedings of the Zoological Society of London**, **136** (3), 331–341.

*Arctobdella branchiarum* n.g., n.sp., from the gills and branchial chamber of *Drepanopsetta platessoides* caught off Iceland, differs from "*Ichthyobdella*" *platycephali* in having a more flattened body, four (?) pairs of testes and spermatophore gland cells inside the terminal parts of the ejaculatory duct; the ventral blood vessel lies within the ventral lacuna and the posterior crop caeca are completely separate. Like *I. platycephali* the spacious coelom with its wide, freely connecting lacunae forms a common cavity in the testicular region broken up only by trabecular fibres.  
R. T. Leiper

- 2457**—LUKIN, E. I. & EPSHTEIN, V. M., 1960. [Kharkovski zootekhicheski institut, U.S.S.R.] [New data on the fresh-water leech fauna of the Crimea.] **Zoologicheskii Zhurnal**, **39** (9), 1429–1432. [In Russian: English summary p. 1432.]

*Erpobdella (Dina) stshegolewi* n.sp., which was found in large numbers at three points in the Crimea, is described and figured. The species is nearest to the forms of *H. lineata* with yellow punctuation across the annuli (i.e. *H. lineata* var. *punctata*, *H. lineata* var. *notata* and *H. lineata* f. *apathyi*) but differs from these by being larger (up to 73 mm. long and 8 mm. wide) and by having well developed papillae and inter-annular grooves, and a large and characteristically shaped atrium. *Batrachobdella algira* was also common, mostly ectoparasitic on adult *Rana ridibunda*.  
G. I. Pozniak

### Miscellaneous

- 2458**—DOLLFUS, R. P., 1959. [Muséum National d'Histoire Naturelle, Paris, France.] "Cestodes et acanthocéphale d'oiseaux récoltés au Pérou par le Dr. Jean Dorst." **Bulletin de la Société Zoologique de France**, **84** (5/6), 384–395.

Dollfus states that *Anonchotaenia jeandorsti* n.sp. from *Tyrannus melancholicus* is considered a new form and that only three other members of *Anonchotaenia*, *A. sbesteriometra*, *A. globata* and *A. trochili* possess four to six testes. *A. zonotrichicola* n.sp. from the intestine of *Zonotrichia capensis peruviansis* is provisionally identified as a member of *Anonchotaenia* and thought to be new because it differs from the 15 members included in this genus by Rausch & Morgan (1947) [for abstract see Helm. Abs., **16**, No. 160e]. *Tetrathyridium* sp. is recorded from *Nothura maculosa agassizi*. *Mediorhynchus paucuncinatus* n.sp. is described from an immature specimen found in the intestine of *Saltator albicollis peruvianus*. The specimen is described as new because it does not resemble any of the 25 species of *Acanthocephala* already included either in the genus *Empodius* or *Mediorhynchus*.  
H. H. Williams

## INVERTEBRATE INTERMEDIATE HOSTS

### Arthropoda

- 2459**—ALLEN, R. W., 1960. "Method of culturing psocids for use in parasitological investigations." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 20.

2460—ANDERSON, J. R., 1961. [University of Wisconsin, U.S.A.] "The biology and taxonomy of Wisconsin black flies (Diptera: Simuliidae)." **Dissertation Abstracts**, 21 (7), 2050.

2461—GRENIER, P. & FERAUD, L., 1960. [Institut Pasteur, Paris, France.] "Étude biométrique et morphologique de la croissance larvaire chez *Simulium damnosum* Theobald." **Bulletin de la Société de Pathologie Exotique**, 53 (3), 563-581.

The authors report the discovery of seven larval stages of *Simulium damnosum* and record the results of detailed morphological studies on these, which they consider will be of practical value in the identification of this vector in the course of epidemiological enquiries into human onchocerciasis. W. M. Fitzsimmons

2462—GRJEBINE, A. & BRYGOO, E. R., 1958. "Contribution à l'étude des moustiques de la région filarienne de la côte sud-est de Madagascar." **Mémoires de l'Institut Scientifique de Madagascar. Série A. Biologie Animale**, 9, 291-306.

In the course of this survey of the mosquitoes of the south-east coast of Madagascar the authors dissected a number in a search for filarial larvae. Of these only *Taeniorhynchus uniformis* from the Ifaho region was found infected. Blood films from the inhabitants of this area showed the presence of *Wuchereria bancrofti* var. *vauceli*. Potential intermediaries found were *Culex pipiens* var. *fatigans*, *Anopheles gambiae*, *A. funestus*, *A. pharoensis* and *A. squamosus*.

S. Willmott

## Mollusca

2463—DUGGAN, A. J., 1960. [Wellcome Museum of Medical Science, Euston Road, London, N.W.1., England.] "The snail host of *Opisthorchis felineus*." **Journal of Tropical Medicine and Hygiene**, 63 (6), 142-146.

Duggan reviews the confusion surrounding the identity of the molluscan intermediate host(s) of *Opisthorchis felineus*; attention is drawn to the variety of spellings of *Bithynia* (= *Bulimus*) given by various authors. *B. leachii* and *B. tentaculata* must not be considered synonyms.

J. W. Smith

2464—GRODHAUS, G., 1960. "Some schistosome cercariae from *Gyraulus*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 33.

In Hume Lake (Fresno County) *Gyraulus* sp. was infected with *Cercaria elongata*, *Gigantobilharzia gyrauli* and an unidentified schistosome cercaria. The last-named also occurred in *Gyraulus* sp. in Ballard Reservoir (Modoc County); this and *C. elongata* produced dermatitis when tested on volunteers.

S. Willmott

2465—HUBENDICK, B., 1961. "Studies on Venezuelan Planorbidae." **Göteborgs Kungliga Vetenskaps- och Vitterhets-Samhälles Handlingar. Series B**, 8 (9), 50 pp.

Hubendick gives an account of the distribution and anatomy of the following Planorbidae from the central area of Northern Venezuela: *Drepanotrema aeruginosus*, *D. anatinum*, *D. kermatoides*, *D. lucidus*, *Helisoma* sp., *Taphius glabratus*, *T. havanensis*, *T. inflexus*, *T. peregrinus* and *T. pronus*. *T. glabratus* is the most important vector of *Schistosoma mansoni* and is the commonest planorbid in the area. 138 figures are given together with photographs of the external shell anatomy of each snail. A map of Venezuela shows the areas from which the specimens were collected.

J. W. Smith

2466—HUNTER, III, G. W. & BIRKENHOLZ, D. E., 1960. "Notes on larval trematodes from snails collected in Gunnison County, Colorado." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 36-37.

*Lymnaea palustris*, *Physa propinqua* and *Helisoma trivolvis* from temporary ponds and a small lake near Crested Butte, Colorado were infected with echinostome, monostome, schistosome, strigeid, gymnocephalous and xiphidiocercariae. The prevalence of echinostome infections increased from about 12% of snails in June to more than 50% in the first half of August.

S. Willmott



- 2467**—KAŠTÁK, V., 1958. [Helmintologický ústav SAV, Košice, Czechoslovakia.] "*Galba truncatula* ako medzihostiteľ *Fasciola hepatica* v ekologických podmienkach Slovenska." **Sborník Československé Akademie Zemědělských Véd. Veterinární Medicina**, **31** (12), 947-956. [English, German & Russian summaries pp. 954-956.]

Kašták gives an extensive review of the biology and ecology of *Galba truncatula*, with special attention to the ecological conditions in Slovakia where it is the commonest intermediate host of *Fasciola hepatica* and is found most frequently in the mountainous zone. N. Jones

- 2468**—MANDAHL-BARTH, G., 1960. [Danmarks Arkvarium, Charlottenlund, Denmark.] "Intermediate hosts of *Schistosoma* in Africa: some recent information." **Bulletin of the World Health Organization**, **22** (5), 565-573.

Mandahl-Barth presents additional information and some emended data for use with his monograph on the intermediate hosts of *Schistosoma mansoni* in Africa [for abstracts see Helm. Abs., **29**, Nos. 843 & 844]. Since *Biomphalaria pfeifferi gaudi* is inseparable from *nairobiensis* except in its distribution and since *nairobiensis* seems to be a transitional stage between *bridouxiana* and *rüppellii*, Mandahl-Barth states that it seems to be wiser not to divide *B. pfeifferi* into subspecies. Experimental investigation may show *B. pfeifferi rhodesiensis* to be a distinct species. *B. sudanica rugosa* n.subsp. is described and figured. The distribution of *Bulinus africanus africanus* and the list of countries from which material of *B. globosus* was examined have been emended from those given in the monograph. *B. nasutus productus* n.subsp. of the *africanus* group is described and figured. *B. tropicus mutandaensis* has been divided into *B. tropicus toroensis* nom.nov. and *B. mutandaensis* (of the *truncatus* group) following examination of Preston's preserved material of *Physa mutandaensis*. *B. sericinus* has been made into a subspecies *B. truncatus sericinus*. A decision whether *B. nyassanus* is a distinct species or a subspecies of *B. truncatus* awaits new material. The vagina of *B. scalaris* is frequently everted and often protrudes below the mantle border and almost reaches the sole of the foot; this has never been observed in any other *Bulinus*. J. W. Smith

- 2469**—MICHELSON, E. H., 1960. [Department of Tropical Public Health, Harvard School of Public Health, Boston, Massachusetts, U.S.A.] "Chemoreception in the snail *Australorbis glabratus*." **American Journal of Tropical Medicine and Hygiene**, **9** (5), 480-487.

Michelson tested 14 baits in a "Y"-shaped maze for their attractiveness to *Australorbis glabratus*. Wheat germ and an alginate-based snail food containing wheat germ were the only baits which attracted snails. Ground watercress leaf acted as a repellent; human faeces and urine did not appear attractive to snails. Experiments involving cauterization of the osphradial organ showed that this organ functions as a chemoreceptor in *A. glabratus*. J. W. Smith

- 2470**—MIYAZAKI, I., KAWASHIMA, K. & YOSHIDA, Y., 1960. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] "Studies on the snail hosts of *Paragonimus ohirai* Miyazaki, 1939 and *P. iloktsuenensis* Chen, 1940." **Kyushu Journal of Medical Science**, **11** (6), 261-275.

Miyazaki *et al.* give photographs and brief descriptions of the external shell anatomy of *Assiminea castanea*, *A. japonica*, *A. kushimotoensis*, *A. latericea miyazakii*, *A. parasitologica*, *A. yoshidayukioi* and *Paludinella japonica* collected from various localities in Japan. They have shown by field and laboratory investigations that the first intermediate hosts of *Paragonimus iloktsuenensis* and *P. ohirai* in Japan are *A. parasitologica* and *A. yoshidayukioi*. Although a small percentage of *A. japonica* and *Paludinella japonica* were successfully infected with *Paragonimus iloktsuenensis* and *P. ohirai* in the laboratory, natural infections were not found. J. W. Smith

- 2471**—MIYAZAKI, I. & YOSHIDA, Y., 1960. "On the first intermediate host of *Paragonimus ohirai* Miyazaki, 1939 and *P. iloktsuenensis* Chen, 1940." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 17.

From both natural and experimental infections Miyazaki & Yoshida have shown *Assiminea parasitologica* and *A. yoshidayukioi* to be intermediaries of *Paragonimus ohirai* in Japan and *A. parasitologica* to be the vector of *P. iloktsuenensis*. The cercariae differ in the number of terminal cells. S. Willmott

2472—NAJARIAN, H. H., 1960. "The effect of *Schistosoma haematobium* infection on egg-production in the snail *Bulinus truncatus*." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 35.  
*Schistosoma haematobium* infections in *Bulinus truncatus* significantly reduced the egg-laying capacity of the snails. S. Willmott

2473—NAJARIAN, H. H., 1960. "Habitat as a factor in the egg production of the snail *Bulinus truncatus* from central Iraq." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 35-36.

2474—RICHARDS, C. S., 1961. [Puerto Rico Field Station, Technology Branch, Communicable Disease Center, Public Health Service, United States Department of Health, Education and Welfare, San Juan, Puerto Rico.] "Another potential intermediate host snail for *Schistosoma mansoni* in Puerto Rico." *Journal of Parasitology*, 47 (1), 64.

A planorbid snail, which Richards states was identified morphologically as *Tropicorbis riisei* (which may be the same as *T. peregrinus* and *T. havanensis*), was exposed to *Schistosoma mansoni* miracidia; *S. mansoni* cercariae were shed 34 days later. Two offspring of this snail developed heavy infections when exposed to miracidia on six occasions over a period of about five months; only one snail shed cercariae. J. W. Smith

2475—WRIGHT, C. A., 1961. [British Museum (Natural History), London, England.] "Taxonomic problems in the molluscan genus *Bulinus*." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 55 (3), 225-231.

Wright outlines the major problems facing the taxonomist when working with the various species of the genus *Bulinus* and draws a helpful analogy between their isolated water habitats and those of the fauna of islands in marine archipelagos resulting in species variations. It is to be hoped that the systematist will eventually discover some fairly easily determined character which is actually linked to susceptibility to schistosome infection. R. T. Leiper

## Control

2476—ANON., 1961. "Molluscicides. Second Report of the Expert Committee on Bilharziasis." *World Health Organization. Technical Report Series*, No. 214, 50 pp.

This second report on schistosomiasis is concerned with molluscicides only and includes (i) a discussion of the advantages and disadvantages of their use, (ii) a review of those in current use, (iii) an account of the preparatory steps that should be taken before any snail campaign is undertaken, (iv) a discussion of the operational problems arising in their application, (v) methods for estimating the effectiveness of their use in the field and (vi) suggestions of standard procedures for use in their development. Standard methods of snail sampling, a technique for examining snails for infection, tests for the determination of the concentration of molluscicides and a comprehensive table giving the properties of both the established and the more recently developed molluscicides are included. J. W. Smith

2477—BURNETT, G. F., 1960. [Filariasis Research Unit, Fiji.] "Filariasis research in Fiji 1957-1959. Part II. Experiments in larval control of mosquito vectors." *Journal of Tropical Medicine and Hygiene*, 63 (8), 184-192.

Burnett describes and discusses the following control measures which have been taken against the mosquito vectors of filariasis in the Fiji Islands: the elimination of the breeding sites of *Aedes polynesiensis* and *A. pseudoscutellaris*; the control of *Pandanus joskei* and *P. tectorius* in the leaf axils of which *A. fijiensis* is known to breed; the use of D.D.T., BHC and dieldrin in the control of *A. pseudoscutellaris*, *A. polynesiensis* and *Culex fatigans*; and the control of land crabs (*Cardisoma carnifex*) with BHC and dieldrin. J. W. Smith

2478—FOSTER, R., TEESDALE, C. & POULTON, G. F., 1960. [Liberian Institute of the American Foundation for Tropical Medicine, Harbel, Liberia.] "Trials with a new molluscicide." *Bulletin of the World Health Organization*, 22 (5), 543-548. [French summary p. 547.]

Foster *et al.* have carried out laboratory and field trials with a new molluscicide, Bayer 73 (2-hydroxy-5, 2-dichloro-4 nitrobenzanilide). In laboratory trials a concentration of 1 p.p.m. of the molluscicide killed all *Biomphalaria pfeifferi nairobiensis* and *Lymnaea natalensis* and



about 80% of *Bulinus tropicus* with both 12-hour and 24-hour exposures. A section of the Nairobi River, Kenya, which contains these same species of snails, was treated with the molluscicide applied with a prototype of the apparatus designed by Foster & Poulton [for abstract see No. 2491 below] at a constant dosage of 1 p.p.m. for 12 hours. All three species of snails and their eggs had apparently disappeared for a minimum distance of three miles below the point of application two months after treatment; it is pointed out that the population sampling techniques used may be defective at low population densities. Throughout the treated area fish were completely eradicated and many frogs died; phytotoxicity was not evident. A postscript reports that, four months after treatment, the population of *L. natalensis* had returned to its approximate pre-treatment density; very little repopulation by either *B. tropicus* or *Biomphalaria pfeifferi nairobiensis* had taken place.

J. W. Smith

**2479**—HIATT, C. W., HASKINS, W. T. & OLIVIER, L., 1960. [Division of Biologics Standards, National Institute of Health, Bethesda, Maryland, U.S.A.] "The action of sunlight on sodium pentachlorophenate." *American Journal of Tropical Medicine and Hygiene*, **9** (5), 527-531. A chemical change takes place in dilute aqueous solutions of sodium pentachlorophenate on exposure to light of wave-length ranging from 290m $\mu$  to 33m $\mu$ , which Hiatt *et al.* suggest may involve oxidation of the pentachlorophenol to the corresponding semiquinone. The reaction follows first-order kinetics, and the velocity constant is directly proportional to the light intensity. After irradiation the solution loses both the ability to render methylene blue soluble in chloroform and the ability to kill *Australorbis glabratus* eggs. The depth, turbidity and amount of shielding by vegetation of the body of water treated with the molluscicide affects the degree of photochemical degradation. The authors suggest that treatment of exposed bodies of clear water with sodium pentachlorophenate may be more successful if done at night.

J. W. Smith

**2480**—KOMIYA, Y., YASURAOKA, K. & HOZAKA, Y., 1960. "Experimental studies on the development of the resistance of *Oncomelania nosophora* to sodium pentachlorophenate." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 36.

**2481**—LE CORROLLER, Y., 1960. [Services de Parasitologie et d'Entomologie Médicale, Institut Pasteur, Paris, France.] "Sur l'action molluscicide du chlorure de baryum sur *Biomphalaria (Planorbis) boissyi*." *Bulletin de la Société de Pathologie Exotique*, **53** (5), 798-802. Barium chloride (crystallized) proved to be lethal to *Biomphalaria (Planorbis) boissyi* at 20 p.p.m., 50 p.p.m. and 80 p.p.m. in aquaria filled with water from the Nile or its canals, with or without plants and fish. The snails died within 48 hours, 36 hours and 24 hours respectively. Raising the dose to 2,000 p.p.m. did not appear to harm the fish or plants. After remaining for 10 to 12 hours in barium chloride solution at various concentrations almost all the snails, when put into untreated water, died within 24 hours of the beginning of the experiment.

N. Jones

## GENERAL HELMINTHOLOGY

### Technique

**2482**—BÉNEX, J., 1960. [Institut Pasteur, Service de Parasitologie, Paris, France.] "Méthode pratique de récolte d'oeufs de schistosomes par digestion enzymatique." *Bulletin de la Société de Pathologie Exotique*, **53** (2), 309-314.

Bénex considers the problem of extracting viable schistosome eggs from tissues without causing hatching of the miracidium. As a proteolytic enzyme she rejects pepsin because it acts at too low a pH. Of papain and trypsin the latter gives the most satisfactory results. A modified "P.B.S." solution is recommended for the solution of the trypsin. For washing after digestion she uses a 10 : 1,000 solution of sodium chloride which she finds to be optimum for preventing hatching and yet preserving the viability of the miracidium.

W. M. Fitzsimmons

2483—BÉNEX, J., 1960. "Conservation en survie des oeufs de *S. mansoni*." **Bulletin de la Société de Pathologie Exotique**, 53 (3), 526–531.

Bénex has studied the survival of eggs of *Schistosoma mansoni* in various media at temperatures from  $-25^{\circ}\text{C}$ . to  $25^{\circ}\text{C}$ . with and without the addition of penicillin, streptomycin, merthiolate or sulphamides. Suspensions of tissue or faeces in sodium chloride solution (10 : 1,000) did not give good results. Eggs obtained by enzymatic digestion of tissues were suspended in sodium chloride (10 : 1,000), Subtosan (polyvidone, 7%) and glucose (70 : 1,000) and the maximum survival was at  $4^{\circ}\text{C}$ . in each case and was 30 to 35 days, 30 days and 15 to 17 days respectively. The addition of glycerol caused death within a few hours. S. Willmott

2484—BERNTZEN, A. K., 1960. "An effective method for the in vitro culture of *Hymenolepis diminuta*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 47.

2485—BRENER, Z. & CHAIA, G., 1960. [Instituto Nacional de Endemias Rurais, Belo Horizonte, Minas Gerais, Brazil.] "Isolamento e manutenção do *Strongyloides ratti* (Sandground, 1925) em condições de laboratório." **Revista Brasileira de Biologia**, 20 (4), 447–451. [English summary p. 451.]

A pure strain of *Strongyloides ratti* from wild rats carrying an infection mixed with *Nippostrongylus muris* can be obtained by culturing faeces mixed with well washed bone charcoal in the dark at room temperature. Filarioid larvae of *S. ratti* appear in 48 to 72 hours whereas those of *N. muris* require more than seven days to appear. Larvae collected by the Baermann method are injected subcutaneously into white rats at the rate of 500 to 2,000. To obtain a pure culture of *N. muris* is more difficult because *S. ratti* larvae persist in cultures; faeces from rats dosed with dithiazanine to eliminate *S. ratti* should be used.

W. M. Fitzsimmons

2486—BREZA, M., LÜBKE, R., MAREK, J. & ROŠKO, L., 1958. [Katedra pre parazitologiu a invázne choroby, Veterinárna fakulta, Košice, Czechoslovakia.] "K laboratórnej diagnostike fasciolózy." **Sborník Československé Akademie Zemědělských Véd. Veterinární Medicina**, 31 (12), 963–970. [English, German & Russian summaries p. 970.]

After a brief review of faecal diagnosis of fascioliasis by direct smear examination, flotation and sedimentation methods with their modifications, Breza *et al.* conclude that the sedimentation method with repeated washings is the most practical.

N. Jones

2487—BULANOV, S. V., 1960. [Diagnosis of dictyocauliasis.] **Veterinariya**, 37 (10), 77. [In Russian.] The addition of one to two drops of 0.1% aqueous solution of methylene blue on to a slide stains the larvae of *Dictyocaulus filaria* a vivid lilac and those of *D. viviparus* a light lilac. Other parasitic larvae and free-living nematodes remain unstained. Small faecal particles are dyed green and the liquid is a light blue colour.

N. Jones

2488—CHU, G. W. T. C., AU, N. & WATSON, D. E., 1960. "Culturing Hawaiian avian marine schistosome *Austroilharzia variglandis* Penner in laboratory media." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 33.

Schistosomulae of *Austroilharzia variglandis*, from the lungs of an experimentally infected tern, maintained in a chicken serum medium at pH 7.4 at  $37^{\circ}\text{C}$ . for three weeks developed into juvenile males and females. After 43 days there was no further development towards sexual maturity. A similar bovine serum medium is also being tested. Maintenance of adults was possible in the medium in the absence of CEE.

S. Willmott

2489—COLEMAN, R. M. & DUTT, G. B., 1960. "Conjugation of an anti-*Hymenolepis* rabbit globulin with lissamine rhodamine B 200." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 12.

2490—COSTELLO, L. C., 1961. [Department of Physiology, School of Pharmacy, University of Maryland, Baltimore, U.S.A.] "A simplified method of isolating *Ascaris* eggs." **Journal of Parasitology**, 47 (1), 24.

To obtain decoated *Ascaris* eggs from uterine tissue the following technique was used: (i) resected uteri were placed in 0.5 N sodium hydroxide solution and then transferred to a tissue homogenizer with a clearance of 0.12 mm. to 0.17 mm. between the mortar tube and



the pestle; (ii) the homogenate was poured off, leaving the pestle in the tube, and centrifuged repeatedly with sodium hydroxide solution and then with distilled water. The final volume of packed eggs, obtained from 25 females was 4 ml. as compared with that of 2.2 ml. obtained by the milking method. N. Jones

**2491**—FOSTER, R. & POULTON, G. F., 1960. [Liberian Institute of the American Foundation for Tropical Medicine, Harbel, Liberia.] "An apparatus for the prolonged and accurate dispensing of suspensions and solutions." **Bulletin of the World Health Organization**, 22 (5), 549-554. [French summary p. 554.]

Foster & Poulton describe an apparatus for dispensing accurately suspensions and solutions, e.g. molluscicides, for prolonged periods of time over a range of flow-rates. J. W. Smith

**2492**—KHANBEGYAN, R. A., 1960. [Armyanski nauchno-issledovatel'ski zhivotnovodstva i veterinarii, U.S.S.R.] [A new method of diagnosis of fascioliasis.] **Veterinariya**, 37 (10), 76-77. [In Russian.] Khanbegyan describes a new faecal sedimentation method for the diagnosis of fascioliasis in sheep, goats and cattle. This technique is said to be more precise and quicker than that of Telemann, than that of centrifugation or repeated decantations, or that of Benedek & Nemeséri. N. Jones

**2493**—KLEIJBURG, P., 1960. [Bedrijfslaboratorium voor Grond- en Gewasonderzoek, Oosterbeek, Netherlands.] "Soil sample examination as a basis for advisory work against stem eelworms, *Ditylenchus dipsaci* (Kühn)." **Nematologica. Supplement II**, pp. 22-27. [German summary p. 27.]

Kleijburg describes a sampling technique, laboratory extraction and estimation of the number of *Ditylenchus dipsaci* present in onion-growing clay soil. One-third hectare areas are each sampled 60 times to a depth of 20 cm. to give a composite sample of 1 kg. of soil per area. This sample is homogenized in water and processed through a flotation funnel on to 75  $\mu$  or 105  $\mu$  sieves. The suspension is poured on to cottonwool filters which are then air dried for not less than 10 hours when 99% of nematodes other than *D. dipsaci* are killed off. Water is then added to the pan containing the filter and about 90% of the *D. dipsaci* are recovered. Nematode losses through the flotation apparatus and the filter are fairly constant (10% to 13%) but the wider the meshes of the sieves used, 50  $\mu$  to 105  $\mu$ , the greater the loss of the nematodes but the cleaner the sample. D. J. Hooper

**\*2494**—KOZHEMYAKIN, N. G. & SHLYAKHTENKO, M. I., 1957. [A new method of activating cysticerci.] **Sbornik Rabot. Leningradski Veterinarni Institut**, Year 1957, No. 16, pp. 76-79. [In Russian.]

**2495**—KRUIDENIER, F. J., 1961. [Zoology Department, University of Illinois, Urbana, Illinois, U.S.A.] "Obtaining free-encysting metacercariae (Trematoda: Digenea) for technical study." **Journal of Parasitology**, 47 (1), 100.

Kruidenier describes a method of coating glass slides with either paraffin wax or parlodion; cercariae may be attached to such surfaces for observation of their encystment. J. W. Smith

**2496**—LYNCH, J. E. & HOEGL, E. E., 1959. [Parasitology Laboratory, Pfizer Therapeutic Institute, Maywood, New Jersey, U.S.A.] "*Syphacia obvelata* as an anthelmintic test organism." **Experimental Parasitology. New York**, 8 (6), 568-573.

Lynch & Hoegl present data on the variation of worm burden in, and the relative incidence of different developmental stages of *Syphacia obvelata*, in 625 naturally infected mice. They illustrate the influence of different developmental stages of the parasite on the activity of three piperazine compounds. The authors point out the importance of using standardized infections when screening new anthelmintics; the difficulties that can arise in the interpretation and reproduction of such tests are discussed. J. W. Smith

**2497**—MOORE, D. V., 1960. [Department of Microbiology, University of Texas Southwestern Medical School, Dallas, Texas, U.S.A.] "A modified filtration and aeration unit for experimental snail aquaria." *Journal of Parasitology*, **46** (6), 767-768.

Moore describes the construction of a filtration and aeration unit for use in experimental snail aquaria, which is designed to reduce the number of fine water droplets cast into the air; when such droplets contain the cercariae of human schistosomes they constitute a potential hazard to the laboratory worker. J. W. Smith

**2498**—ROHDE, K., 1960. [Zoology Department, University of Malaya in Kuala Lumpur, Pantain Valley, Kuala Lumpur, Malaya.] "White rats infected with *Litomosoides carinii* suitable for routine screening of filaricide compounds." *Journal of Parasitology*, **46** (6), 764.

Rohde experimentally infected 99 white rats with *Litomosoides carinii* and found an average of 19 worms in each at autopsy 71 to 130 days after infection. All but three rats had microfilariae in their peripheral blood. The following method for the routine screening of possible filaricidal compounds has been developed based on the present evidence and on that of earlier work by Rohde [for abstracts see Helm. Abs., **28**, No. 77b and **30**, No. 790]. 0.05 ml. of blood is taken from the tail of a white rat 60 days after its infection with *L. carinii*. This blood is mixed with 5 ml. of water, centrifuged and decanted; the microfilariae in the small residue are counted in a Zschucke counting cell using a magnifying power of 1 : 60. The filaricide to be checked is administered to the rat; one or two days later the microfilariae are counted again by the same method. After a week another compound may be given; rats may be used for about 120 days after infection. J. W. Smith

**2499**—RUSSELL, Jr., H. T., 1960. [Department of Biology, University of California at Santa Barbara, Goleta, California, U.S.A.] "A method of handling small parasites during staining procedures." *Journal of Parasitology*, **46** (6), 723.

Russell describes the preparation of a small, clear plastic box with a silk bolting cloth bottom for handling small helminths during staining procedures; because of the effect of organic solvents on plastic the worms must be removed from the box for clearing. J. W. Smith

**2500**—SAULNIER, J. & DESCHIEENS, R., 1960. "Appréciation colorimétrique des doses de chlorure de baryum dissoutes dans les eaux douces (actions molluscicides en prophylaxie bilharzienne)." *Bulletin de la Société de Pathologie Exotique*, **53** (5), 802-806.

Saulnier & Deschiens describe a method for titrating barium chloride in fresh water. This is based on precipitating barium by potassium chromate, using a buffer solution of crystallized sodium acetate and acetic acid. The precipitate (barium chromate) is centrifuged, dissolved in dilute hydrochloric acid and compared with standard solutions, which are yellow due to the presence of potassium dichromate. N. Jones

**2501**—SEN, H. G. & KELLEY, Jr., G. W., 1960. "Attempts to axenic culture of lungworms of swine." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 24.

Chick embryo extract, Hanks medium, trypticase medium and a combination of Hanks and trypticase media were tested for the axenic culture of *Metastrongylus apri* and *M. pudendotectus* third-stage larvae. In chick embryo extract and the trypticase medium the third-stage larvae survived eight days but almost no moulting took place. Hanks medium promoted the best growth, 15% of larvae reaching the fifth stage in 192 hours but survival was low, nearly all being dead in eight days. Trypticase-Hanks medium gave nearly as good growth as Hanks alone and by the eighth day 16% and 10% had moulted into fourth and fifth-stage larvae respectively; almost all were alive and some grew to maturity when inoculated into the bronchus of a pig. S. Willmott

**2502**—STORM, L. W., STORM, N. S. & DAHLGREN, D. A., 1960. [Department of Plant Pathology, University of Arizona, Tucson, Arizona, U.S.A.] "A modification of the Büchner funnel method for transferring and concentrating nematodes." *Plant Disease Reporter*, **44** (6), 450.

Suspensions of nematodes can be concentrated by taking them up in a hypodermic syringe fitted with a special American-made adaptor containing a fine filter, reducing the volume of liquid by pressure on the plunger of the syringe, and washing the nematodes off the filter. The apparatus has uses both for living and dead nematode suspensions. C. C. Doncaster



**2503—TARJAN, A. C., 1960.** [Florida Citrus Experiment Station, University of Florida, Lake Alfred, Florida, U.S.A.] "A comparison of polyethylene plastic bags and glass jars as incubation chambers for obtaining nematodes from roots." **Plant Disease Reporter**, **44** (7), 574-577.

A former method of estimating populations of *Radopholus similis* in citrus roots consisted of incubating roots and soil in sealed glass jars and then extracting by an elutriation process. Tests showed that a higher yield of nematodes could be obtained if roots were incubated in polythene bags. The yield was highest when roots without soil were incubated. C. C. Doncaster

**2504—VIGLIERCHIO, D. R., 1961.** [Department of Plant Nematology, University of California, Davis, California, U.S.A.] "A simplified technique for hatching tests of *Heterodera schachtii*." **Phytopathology**, **51** (5), 330-332.

Viglierchio describes a technique for hatching cysts of *Heterodera schachtii* in small, stainless steel mesh hemispheres which rest inside a well so that the cysts are immersed in fluid to a depth of 1 mm. The cysts and cell can be washed, the contents removed and fresh hatching solution added without disturbing the cysts. H. R. Wallace

**2505—WIKERHAUSER, T., 1960.** [Department of Parasitology and Parasitary Diseases, Veterinary Faculty, University of Zagreb, Zagreb, Yugoslavia.] "A rapid method for determining the viability of *Fasciola hepatica* metacercariae." **American Journal of Veterinary Research**, **21** (84), 895-897.

To determine the viability of *Fasciola hepatica* metacercariae, the following media were used: (i) pepsin solution, (ii) trypsin solution alone or with 10% or 20% ox bile, (iii) ox bile alone. The author also studied the action of pepsin solution alone or followed by whole ox bile or by physiological saline. The tests were carried out at 38°C. and the results showed that: (i) trypsin solution alone or with ox bile did not affect metacercariae, (ii) pepsin solution caused partial digestion of the outer layer of the cyst, (iii) the highest rate of excystment (about 80%) was obtained by treating metacercariae with pepsin solution for two to three hours and then with trypsin solution with 20% ox bile, (iv) if after excystment the medium was replaced by Tyrode's solution, metacercariae survived up to 42 hours. N. Jones

### Geographical Distribution

**2506—BOURNS, T. K. R., 1961.** [Department of Zoology, University of Western Ontario, Canada.] "Schistosome cercaria in Ontario." **Canadian Journal of Zoology**, **39** (1), 43-46.

Bourns obtained cercariae of *Schistosomatium douthitti* from 92 of 2,474 *Lymnaea stagnalis appressa* and *L. palustris elodes* collected from nine locations in central and western Ontario from 1957 to 1960. This appears to be the first record of the occurrence in Canada of this dermatitis-producing schistosome. *S. douthitti* was found at Cameron Lake, the only swimming area surveyed and where schistosome dermatitis has been reported. Further collections may show the distribution of this parasite to be still broader in view of the almost universal North American distribution of the natural definitive hosts *Ondatra zibethica* and *Microtus pennsylvanicus*. *Trichobilharzia ocellata* was found in *L. stagnalis appressa* from two locations. J. W. Smith

**2507—CHAMBERLAIN, R., 1961.** [Department of Agricultural Zoology, Queen's University of Belfast, Northern Ireland.] "Potato root eelworm in the Canary Islands." [Correspondence.] **Nature**, **London**, **189** (4766), 773.

Chamberlain reports the finding of *Heterodera rostochiensis* in potato fields in the north of Tenerife, Canary Islands. This is thought to be the most southerly occurrence (latitude 28° 25'N.) of *H. rostochiensis* reported in the Old World. D. J. Hooper

**2508—HOFFMAN, G. L., 1957.** [Department of Bacteriology, University of North Dakota, Grand Forks, North Dakota, U.S.A.] "Studies on the life cycle of *Cryptocotyle concavum* from the common sucker and experimentally in the chick." [Abstract of paper presented at the 49th Annual Meeting of the North Dakota Academy of Science.] **Proceedings of the North Dakota Academy of Science**, **11**, 55-56.

Hoffman found 11 of 29 *Catostomus c. commersonnii* infected with the metacercariae of *Cryptocotyle concavum* from Turtle River, North Dakota. Six other species of fishes examined were not infected. This metacercaria is new for North America. The metacercaria and adult (recovered from chicks fed with metacercariae) are described. J. W. Smith

- 2509—HUTCHISON, W. F. & BRYAN, M. W., 1960. [Department of Preventive Medicine, University of Mississippi, School of Medicine, Jackson, Mississippi, U.S.A.] "Studies on the hydatid worm, *Echinococcus granulosus*. I. Species identification of the parasite found in Mississippi." *American Journal of Tropical Medicine and Hygiene*, 9 (6), 606–611.

Hutchison & Bryan have determined that the species of *Echinococcus* occurring in Mississippi is *E. granulosus*. This conclusion is based on: (i) the fact that the known definitive and intermediate hosts for *E. multilocularis* did not become infected with material of Mississippi origin, (ii) the cysts in three experimentally infected pigs were unilocular and (iii) the morphology of the tapeworm stage coincides with previous descriptions of *E. granulosus*. Descriptions of the adult at various periods during development are given. G. A. Webster

- 2510—INGLIS, W. G. & DÍAZ-UNGRÍA, C., 1960. [British Museum (Natural History), Cromwell Road, London, England.] "Nematodes de Venezuela, V. Sobre una colección del Distrito Mara (Zulia)." *Acta Biologica Venezuelica*, 3 (4), 67–81. [English summary p. 79.]

The following are not new host records but are new records for Venezuela and are redescribed: *Paraoxyuronema brachytelesi* from *Ateles belzebuth*, and *Kiluluma longipene* and *Monodontus nefastus* from *Tapirus terrestris*. *Paraoxyuronema* is provisionally referred to the Oxyurinae. W. M. Fitzsimmons

- 2511—KOPŘIVA, J., 1958. [Katedra Zoologie, Vysoká škola zemědělské a lesnické, Brno, Czechoslovakia.] "Nález motolice *Plagiorchis maculosus* u jiříčky obecné." *Zoologické Listy. Brno*, 7 (1), 21–23. [German & Russian summaries p. 23.]

*Plagiorchis maculosus* is described and figured from the martin, *Delichon urbica*. This is the first occasion on which it has been reported from Czechoslovakia. N. Jones

- 2512—LAYNE, J. N., BIRKENHOLZ, D. E. & GRIFFO, Jr., J. V., 1960. [Department of Biology, University of Florida, Gainesville, Florida, U.S.A.] "Records of *Dracunculus insignis* (Leidy, 1858) from raccoons in Florida." *Journal of Parasitology*, 46 (6), 685.

Layne *et al.* record *Dracunculus insignis* from *Procyon lotor* in Florida. This is a first record for the south-eastern U.S.A. They summarize the records of guinea-worm from North America giving hosts, distribution and bibliographical records. W. M. Fitzsimmons

- 2513—METTRICK, D. F., 1960. [University College of Rhodesia & Nyasaland, Salisbury, Southern Rhodesia.] "Helminth parasites of Hertfordshire birds—III. Nematodes." *Journal of Helminthology*, 34 (3/4), 259–266.

In this survey, *Porrocaecum ensicaudatum* from *Turdus pilaris* is a new host record, and the same nematode is recorded from *Garrulus glandarius* for the first time in Britain; *Capillaria columbae* from *Columba livia domestica* is also claimed as a new record for Britain. In addition *P. ensicaudatum*, *Syngamus trachea*, *Capillaria ovopunctata*, *C. resecta* and *C. exilis* are reported from a variety of birds. *P. ensicaudatum* is redescribed and discussed; *S. trachea* is briefly redescribed and discussed and *S. skrjabini* is placed in synonymy with it.

W. M. Fitzsimmons

- 2514—METTRICK, D. F., 1960. [University College of Rhodesia & Nyasaland, Salisbury, Southern Rhodesia.] "Helminth parasites of Hertfordshire birds—IV. Survey of results." *Journal of Helminthology*, 34 (3/4), 267–276.

This paper includes observations on the incidence and distribution of trematode, cestode, nematode and acanthocephalan parasites in 22 species of British birds. Particular note is taken of seasonal and age incidence and possible explanations for these phenomena are offered.

W. M. Fitzsimmons

- 2515—METTRICK, D. F., 1961. [Department of Zoology, University College of Rhodesia and Nyasaland, Salisbury, Southern Rhodesia.] "*Taenia madagascariensis* Davaine, 1870, a cestode parasite of man, rodents and other African mammals." *Central African Journal of Medicine*, 7 (3), 83–84.

Several species of *Raillietina* have been identified in rodents in Rhodesia. Mettrick sees no reason why human infections with *Raillietina* sp. and *Inermicapsifer madagascariensis* could not occur in the Federation. N. Jones



**2516**—SCHIEBER, E., SOSA, O. N. & ESCOBAR, P., 1961. [Instituto Agropecuario Nacional, Guatemala, C. A.] "Root-knot nematode on kenaf in Guatemala." **Plant Disease Reporter**, **45** (2), 119.

In a preliminary survey of the Pacific coast area of Guatemala *Meloidogyne incognita* var. *acrita* was found for the first time. It attacks kenaf (*Hibiscus cannabinus*) causing stunting and chlorosis above ground and destruction of secondary roots and galling of the root system. The disease occurs in circular patches.

M. T. Franklin

**2517**—WILLIAMS, H. H., 1960. [Department of Zoology, University College of Wales, Cardiff, South Wales.] "*Winkenthughesia bramae* (Parona & Perugia, 1896), a rare monogenetic trematode and a new record for the British Isles." **Annals and Magazine of Natural History**. Series XIII, Year 1959, **2** (21), 551–559.

*Winkenthughesia bramae* from *Brama raii* is recorded for the first time in the British Isles; this is the second record since its original discovery by Parona & Perugia on the gills of the same host. The external features, alimentary canal, excretory, nervous and reproductive systems of *W. bramae* are described and the controversy regarding the systematic position of the species is discussed.

H. H. Williams

**2518**—WORLEY, D. E., 1961. [Parke, Davis & Co., Research Division, Ann Arbor, Michigan, U.S.A.] "The occurrence of *Filaria martis* Gmelin, 1790, in the striped skunk and badger in Kansas." **Journal of Parasitology**, **47** (1), 9–11.

This appears to be the first report of *Filaria martis* in the U.S.A. Encapsulated adults were found in three striped skunks and in one of four badgers examined.

N. Jones

**2519**—YUCEL, A. & DESCHIENS, R., 1960. [Service de Parasitologie, Institut Pasteur, Paris, France.] "Dépistage d'un foyer de filariose à *Wuchereria bancrofti* en Turquie Orientale." **Bulletin de la Société de Pathologie Exotique**, **53** (5), 885–891.

Yucel & Deschiens report on the finding of a focus of *Wuchereria bancrofti*, which is probably of ancient origin, in the mountainous region of Elâzig, Turkey. This focus is of particular interest because of its relatively northern situation. *Culex molestus* is probably a vector. The local inhabitants treat the lesions by the application of a portion of the stomach of a newly killed fox to the site; the adult worms migrate through the skin and the fox stomach tissue as far as the bandage. This has been verified by one of the authors.

W. M. Fitzsimmons

**2520**—ZAJÍČEK, D., 1960. [Státní vědecký veterinární ústav, Prague, Czechoslovakia.] "Příspěvek k druhovému výskytu a patogenitě vlasovek rodu *Amidostomum* Railliet et Henry 1909 (Nematoda)." **Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina**, **33** (10), 775–788. [German & Russian summaries pp. 787–788.]

*Amidostomum anseris* was found in domestic geese and swans, *A. boschadis* in domestic ducks and mallards (*Anas platyrhynchos*), and *A. fulicae* in coots (*Fulica atra*) in Czechoslovakia. An incidence of up to 100% of *A. boschadis* was observed in a locality frequented by wild ducks. *A. boschadis* and *A. fulicae* are reported for the first time from Czechoslovakia. The male:female ratio was 1 : 2 in *A. anseris* and *A. boschadis* infections, whereas it was 1 : 1 in *A. fulicae*. The parasites are described and illustrated in detail.

N. Jones

## Cytology and Genetics

**2521**—BURTON, P. R., 1961. [The University of North Carolina, U.S.A.] "A cytological study of gametogenesis in the frog lung fluke, *Haematoloechus medioplexus* (Trematoda: Plagiorchiidae)." **Dissertation Abstracts**, **21** (9), 2831.

In *Haematoloechus medioplexus* the spermatids each contain a single centriole and occur in rosettes of 32. After formation of the sperm a vacuolated mass of cytoplasm containing some mitochondria is left behind; each sperm is about 400  $\mu$  long. Sperm penetration must take place before meiosis in the oocytes will proceed beyond diplotene. Small bodies are released from the nucleoli of older oocytes which pass through the nuclear membrane and aggregate in the cytoplasm; after sperm penetration these bodies disappear. The diploid chromosome number of *H. medioplexus* is 22.

J. W. Smith

## Morphology, Anatomy and Histology

- 2522**—BABERO, B. B., 1960. [Southern University A. & M. College, Baton Rouge, Louisiana, U.S.A.] "Studies on the larval morphology of *Ascaris laevis* Leidy, 1856." **American Midland Naturalist**, **64** (2), 349–361.

Babero describes and illustrates with photomicrographs the larval stages of *Ascaris laevis* together with a brief account of the morphology and synonymy of the adult. The so-called "boring-tooth" described in *A. lumbricoides* was not observed in *A. laevis* during escape of the young worm from the egg. *A. laevis* has five larval stages, each of which except the first is preceded by ecdysis and a growth phase. The structure of the three cuticularized lips of the adult, and of the cuticularized bosses in the pre- and post-anal areas of the male adult *A. laevis* are somewhat similar to those described for *A. devosi*. The author presents a table comparing the morphology of *A. laevis* with that of *A. tarbagan* and suggests that the two are synonymous.

J. W. Smith

- 2523**—BAER, J. G., 1957. [Université de Neuchâtel, Institut de Zoologie, Neuchâtel, Switzerland.] "Un ténia rare, *Sphyrnchotaenia uncinata* Ransom, 1911, parasite d'une outarde africaine." **Bulletin de la Société Neuchâteloise des Sciences Naturelles**, **80**, 179–186.

Baer gives a detailed and illustrated redescription of *Sphyrnchotaenia uncinata* from young and mature specimens obtained from two *Neotis cafra jacksoni* from Uganda, and emends the diagnosis of the genus. The genital ducts pass on the ventral side of the nerve and excretory vessels, not dorsally as previously stated by Baer in 1955. The structure of the rostellum is unique in the Davaineidae; it is long and cylindrical and the extremity has several rows of hooks quite irregularly arranged and behind these is a zone armed with spines. All other members of the family have a double crown of hooks except *Cotugnia* which has three. *S. uncinata* is a rare species from a host with a limited distribution. It appears likely that it has arisen in this host as a mutation from *Chapmania macrocephala*.

S. Willmott

- 2524**—CHITWOOD, B. G., 1960. [Laboratory of Comparative Biology, Kaiser Foundation Research Institute, Richmond, California, U.S.A.] "*Choanolaimus psammophilus* J. G. de Man, 1880, rediscovered and *Synonchium obtusum* N. A. Cobb, 1920, as a natural enemy of plant pathogens." **Nematologica. Supplement II**, pp. 56–60. [German summary p. 59. Discussion p. 60.]

Chitwood redescribes, from a single male specimen, *Choanolaimus psammophilus*. There is a spinneret at the tail terminus and seven pre-anal supplementary organs. De Man reported that a ventral pore, caudal glands and papillae were absent. *Synonchium obtusum* is also redescribed from males and females. Both these species were associated with roots of spermatophytes growing on a marine beach in California. Marine and fresh-water fauna appear to meet at this locality as several *S. obtusa* had ingested whole specimens of *Tylenchorhynchus cylindricus*.

D. J. Hooper

- 2525**—ETGES, F. J. & SHARMA, M. L., 1960. "Studies on the genus *Metorchis* Looss, 1899 (Trematoda: Opisthorchiidae)." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 21.

The specimens of *Metorchis* collected by Babero from an Alaskan husky dog differ from *M. albidus* (from the same host) in the following characters: body up to twice as large with correspondingly larger organs, except the ovary and oral sucker which are smaller, and the ovary dorsal to the seminal receptacle.

S. Willmott

- 2526**—EUZET, L., 1957. "Larves gyroductyloïdes nageantes de quelques Microcotylidae (Trematoda: Monogenea)." **Bulletin de la Société Neuchâteloise des Sciences Naturelles**, **80**, 187–194.

Euzet describes and figures the free-swimming larvae of *Microcotyle chrysophrii*, *M. labracis*, *M. mormyri* and *M. sargi*. The first three of these resemble each other and the free-swimming larva of *Axine belones* very closely in general appearance and in the arrangement of the armature of the adhesive disc having, on each side, five small hooks (four lateral and one postero-lateral), one large hook and one articulated hook. The armature of the adhesive disc in *M. sargi* larvae is very different there being, on each side, a sucker with armature very similar to that found in the adult, four small hooks (three lateral and one postero-lateral) one simple straight rod ("tigelle") and one articulated hook. These observations are compared with the description



of the larva of *M. spinicirrus* by Remley in 1948 in which the adhesive disc armature is given as six small hooks (four lateral and two postero-lateral), one large hook and one articulated hook on each side. In all these species the small hooks are ogive-shaped. S. Willmott

**2527**—FRASER, P. G., 1960. [Department of Zoology, University of Glasgow, Glasgow, Scotland.] "On *Diphyllbothrium medium* (Fahmy, 1954) parasitic in trout in Great Britain." *Journal of Helminthology*, **34** (3/4), 193–204.

Fraser redescribes and figures *Diphyllbothrium medium* Fahmy, 1954. Adult worms were obtained by feeding trout infected with *D. medium* plerocercoids to rats. The proceroid stage is found in *Diaptomus gracilis*, *Cyclops vicinus* and *C. viridis*, the plerocercoid in *Salmo trutta* and *S. irideus*, and the adult in *Lutra lutra*. The morphology of *D. medium* is compared with that of other species of *Diphyllbothrium*. J. W. Smith

**2528**—GIBBS, H. C., 1960. [Animal Pathology Laboratories, Health of Animals Division, Canada Department of Agriculture, Montreal Area Branch Laboratory, Macdonald College, Quebec, Canada.] "A redescription of *Avitellina arctica* Kolmakov, 1938 (Anoplocephalidae: Thysanosomeinae), from *Rangifer arcticus arcticus* in northern Canada." *Journal of Parasitology*, **46** (5), 624–628.

Gibbs redescribes, with the aid of photomicrographs, *Avitellina arctica* taken from *Rangifer arcticus arcticus*. *A. arctica* most closely resembles *A. centripunctata*. The two species differ in the position of the cirrus sac and in the shape and morphology of the paruterine organs. *A. arctica* has four or five testes per segment lateral to, and eight or nine testes per segment medial to the excretory canals. Individual variations occur at the anterior end of *A. arctica*. There appear to be definite host and ecological differences between the two species. *A. centripunctata* is a parasite of horned ruminants in temperate and torrid zones, while *A. arctica* has only been described from Cervidae in boreal regions. J. W. Smith

**2529**—HILLIARD, D. K., 1960. [Environmental Sanitation Section, Arctic Health Research Section, U.S. Department of Health, Education & Welfare, Anchorage, Alaska.] "Studies on the helminth fauna of Alaska. XXXVIII. The taxonomic significance of eggs and coracidia of some diphyllbothriid cestodes." *Journal of Parasitology*, **46** (6), 703–716.

Eggs and coracidia of 11 species of diphyllbothriid cestodes were examined for features of possible taxonomic value. The eggs of the species studied can be separated according to the environment of the last intermediate host, i.e. fresh-water, brackish or marine. In a marine situation the eggs usually have a width : length ratio greater than 1 : 1.45, while those developing in fresh water have a lower ratio. In the former habitat the surface of the shell is scrobiculate, with the size and arrangement of the pits differing according to the species, while in fresh water the shell is smooth and plain. The shells of marine forms exceed  $2\mu$  in thickness but in fresh-water species it is about  $1\mu$ . In the former the opercular sutures viewed in optical section are deeply notched; in the latter they are smooth. Hook form is fairly diagnostic for *Diphyllbothrium lanceolatum*, *D. cordatum*, *D. ditremum* and *Diplogonoporus balaenopterae*, while in *D. ursi*, *D. alascense*, *D. osmeri*, *D. dalliae*, *D. dendriticum*, *Pyramicocephalus phocarum* and *Schistocephalus solidus* the hook structures were too variable to be of diagnostic value. Platin cell counts appear to have considerable taxonomic value, statistical consideration showing the mean and range to be in close agreement for a given species except in the case of an unidentified species of *Diphyllbothrium* and *D. dalliae* which showed comparable counts. Observations were made on the swimming behaviour of living coracidia and the effects of temperature, pressure and light on the hatching of eggs are discussed. H. H. Williams

**2530**—INATOMI, S., 1960. [Department of Parasitology, Okayama University Medical School, Okayama, Japan.] "Submicroscopic structure of the egg shell of helminth. II. A study on *Trichuris vulpis*." *Acta Medicinæ Okayama*, **14** (4), 257–260.

In electron photomicrographs of the egg of *Trichuris vulpis* the shell appears as one dense layer, probably of chitin, about  $4\mu$  in thickness consisting of alternate opaque and less opaque layers; no limiting membrane can be seen at either surface. The plug consists of a meshwork of transparent microfibrils, probably of a mucoid nature, with an opaque limiting membrane at both surfaces. J. W. Smith

- 2531**—INATOMI, S., 1960. [Department of Parasitology, Okayama University Medical School, Okayama, Japan.] "Submicroscopic structure of the egg shell of helminth. III. A study on *Capillaria hepatica*." *Acta Medicinæ Okayama*, **14** (4), 261–264.

In electron photomicrographs of the egg of *Capillaria hepatica* the shell appears to be divided into an outer layer, approximately  $0.25\mu$  in thickness with numerous holes arranged radially, and a denser inner layer from  $2\mu$  to  $3\mu$  in thickness consisting of several alternate opaque and less opaque layers. Both plugs are from  $4\mu$  to  $5\mu$  in thickness and from  $4\mu$  to  $6\mu$  in diameter and have granular zones near their outer surfaces.

J. W. Smith

- 2532**—JAIN, G. P., 1960. [Department of Zoology, Mahakoshal Mahavidyala, Jabalpur (M.P.), India.] "Further observations on *Artyfechinostomum mehrai* (Faruqui) (Echinostomatidae: Trematoda)." *Parasitology*, **50** (1/2), 7–11.

Jain further describes and figures *Artyfechinostomum mehrai* from a study of 50 adults taken from the intestine of experimentally infected white rats. Marked individual variations were observed in the length of the pre-pharynx and of the cirrus sac and in the shape of the ovary which was pear-shaped in some and typically bilobed in others.

E. I. Sillman

- 2533**—KÄMPFE, L., 1960. [Zoologisches Institut, Halle/Saale, Germany.] "Über den Wert von Schwanzform und Körpermassen für die Artdiagnose der Nematoden (dargestellt an der Gattung *Heterodera* Schm.)." *Nematologica. Supplement II*, pp. 112–121. [English summary p. 120. Discussion p. 122.]

More than 200,000 larvae of *Heterodera schachtii* and *H. rostochiensis* were examined for morphological aberrations. Abnormalities in the form of the tail were the commonest. Kämpfe suggests that variations in measurements of these species may be caused by (i) measurement at different times after emergence from cysts, (ii) differences in moisture and osmotic pressure to which larvae and cysts had previously been subjected, (iii) different proportions of dead and living larvae in the sample and (iv) differences in osmotic regulation between individuals.

H. R. Wallace

- 2534**—KRUIDENIER, F. J., 1960. "Observations on the ultrastructure and histochemistry of cercarial glands." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 19.

Pre-acetabular, post-acetabular and the few subcuticular glands present in *Schistosoma mansoni* cercariae can be differentiated by their ultrastructure. Series of Schiff-positive subcuticular cystogenous glands are present in an armate cercaria tentatively identified as *Tetrapapillatrema concavocorpa*; these appear to be histochemically similar to glands observed in other cercariae and can also be differentiated by their ultrastructure.

S. Willmott

- 2535**—KRUIDENIER, F. J., 1960. "Ultrastructure in the tails of furcocercous cercariae." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 32.

The sarcotubules previously described by Kruidenier & Vatter in the tail muscles of *Schistosoma mansoni* cercariae have been shown to be present also in those of *Schistosomatium douthitti* and in strigeid cercariae. Circular muscles in the tails are penetrated erratically by the sarcotubules but the longitudinal myofibres are penetrated at regular intervals. The sarcotubules interdigitate with the myofilaments and are closely associated with the cell membranes. The arrangement of the sarcoplasmic reticular system appears to be correlated with the functional activity of the tail muscles and with the phylogeny of the Anepitheliocystidia.

S. Willmott

- 2536**—KRUIDENIER, F. J. & MEHRA, K. N., 1960. "The accessory piece in the differentiation of certain oxyurids of the genus *Syphacia* Seurat, 1916." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 19–20.

Type specimens of *Syphacia peromysci* are not available but the authors have studied material from the type host (*Peromyscus l. leucopus*). Particular attention was paid to characteristics which would distinguish the males from those of closely related species and it was observed that the accessory piece possesses five bilateral pairs of blunted, minute projections, similar to the minute irregularities previously described for *S. thompsoni*. They are not present in *S. obvelata* or *S. muris*.

S. Willmott



**2537**—KRUIDENIER, F. J., MEHRA, K. N. & HARKEMA, R., 1961. [University of Illinois, Urbana and North Carolina State College, Raleigh, U.S.A.] "Comparative studies of *Syphacia peromysci* and *S. samorodini* (Nematoda: Oxyuridae)." *Journal of Parasitology*, **47** (1), 47–51, 52.

Having compared 30 males and 50 females of *Syphacia peromysci*, from *Peromyscus leucopus* in North Carolina, with the description and type specimens of the closely related *S. samorodini*, the authors find that *S. peromysci* differs from the latter by (i) the presence of a pair of cervical papillae in the female, (ii) a relatively posterior vulva, (iii) a less muscular and anteriorly curved vagina and (iv) a longer terminal cuticular spike, without a hook, in the male. There are other apparent differences, namely, the morphology of the accessory piece (fused to the gubernaculum), and the size of eggs. It is suggested that both species should be retained at present.

N. Jones

**2538**—LE-VAN HOA, 1960. "Redescription de quelques *Capillaria* peu connus, récoltés à Richelieu (Indre-et-Loire)." *Annales de Parasitologie Humaine et Comparée*, **35** (4), 594–606.

Four known species of *Capillaria* collected at Richelieu (Indre-et-Loire) are redescribed and figured: *C. exigua* from *Erinaceus europaeus* in which it was relatively common, *C. resecta* from *Garrulus glandarius*, *C. corvorum* from *Corvus corone*, and *C. myoxi-nitela*, the male of which is described for the first time, from *Eliomys quercinus*. The worms from a shrew identified as *C. exigua* by Joyeux & Baer in 1937 differ from the original description of *C. exigua* in the larger size of the anterior of the two transparent vulvar lips and the forward incurving of the bursal rays. *C. corvorum* differs from *C. resecta* in having thickenings instead of bursal rays and in lacking a vulvar appendage. The bursa of *C. myoxi-nitela* has two unequal pairs of rays supporting the posterior expansion of the bursa and the anus is subterminal.

N. Jones

**2539**—LOGACHEV, E. D., 1959. [Kamersovski gosudarstvenni meditsinski institut, U.S.S.R.] [The structure and histological nature of cuticular integuments in cysticeri.] *Doklady Akademii Nauk SSSR*, **125** (6), 1390–1392. [In Russian.]

The cuticle lining the invaginated scolex and surrounding the cysts of *Cysticercus cellulosae* is homogeneous and equivalent to the *pars lucida* and has an external shedding layer comparable to the *pars decidua* of adult cestodes [see also Helm. Abs., **24**, No. 791a]. A *pars fibrata* is absent. Instead, underlying the cuticle is a network of perpendicular muscle fibres under which is a flattened, tightly packed layer formed by the desmocytes. Deeper their cytoplasmic processes anastomose to form a reticular structure. Amoebocytes and young desmoblastic elements are present under the muscle fibre layer. Logachev was unable to observe the primordia of the hooks; partly grown hooks had an external transparent (cortical) layer and an internal medullary layer which disappeared in fully formed hooks.

G. I. Pozniak

**2540**—LOGACHEV, E. D., 1960. [Kafedra obshchei biologii, Kemerovski meditsinski institut, U.S.S.R.] [The histology of the sunken epithelium of cestodes.] *Trudy Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, **12**, 137–139. [In Russian.]

Working with six cestode species, Logachev was able to show that the subcutaneous cells arise in growing parts of the strobila from basophilic amoebocytes of the connective tissue, indicating their mesodermal origin. Some of the cells changed into desmocytic elements which were first seen in the posterior part of the neck. In mature segments the subcuticular cells were able to transform into granular amoebocytes with a trophic function. In some pathogenic conditions, such as the inflammatory condition of the wall in *Digramma interrupta* plerocercoids, the subcuticular cells reverted to amoeboid or macrophagic elements.

G. I. Pozniak

**2541**—NADAKAL, A. M., 1960. "Studies on the excretory and nervous systems of the sheep tape-worm *Avitellina centripunctata* (Rivolta, 1874)." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 12–13.

The excretory canals in the scolex of *Avitellina centripunctata* show characteristic coiling; the dorsal and ventral canals are confluent on each side. There is no communicating branch between the right and left internal loops and "nephrocytes" are present—characters which

differ from those in *A. goughi*. No opening of the paruterine organs into the ventral excretory canals was observed. In the nervous system the two lateral ganglia each contain approximately 306 neurons, the dorsal and ventral each 85 and the transverse and dorso-ventral commissures 65 and 12 respectively. S. Willmott

**2542**—ODENING, K., 1960. "Das Exkretionsgefäß-system von *Haematoloechus variegatus* und *H. asper* (Trematoda, Plagiorchiidae)." **Biologisches Zentralblatt**, **79** (1), 91–97.

The bladder, connecting tubes, main and side tubules, capillaries and flame cells of the excretory systems of *Haematoloechus variegatus* and *H. asper* were studied by phase contrast microscopy and are described. This is the first record of side tubules and connecting tubes in members of the Haematoloechinae. The flame cell formula is  $2[(3+3+3)+(3+3+3)]$ . The capillaries are not in one tuft but one of them joins the side tubule separately behind the other two, and the connecting tubes (which are formed by the junction at each side of the anterior and posterior main tubule) enter the bladder at the anterior edge of one of the bladder arms. The pattern is similar to that in Plagiorchiinae and Opisthioglyphinae and confirms that Haematoloechinae belong to the Plagiorchiidae. G. I. Pozniak

**2543**—ODENING, K., 1961. [Zoologische Forschungsstelle der Deutschen Akademie der Wissenschaften, Berliner Tierpark, Berlin-Friedrichsfelde, Germany.] "Das Exkretionssystem und die systematische Stellung von Macrodera (Trematoda: Ochetsomatoidea)." **Biologisches Zentralblatt**, **80** (1), 85–90.

Odening describes for the first time the excretory system of *Macrodera longicollis* from immature specimens. The bladder is Y-shaped, the arms reaching to the anterior edge of the ovary. The connecting tubules join the bladder at points halfway along the arms on their outer sides, as is typical for ochetsomatoids. The flame cell formula is  $2[(3+3+3)+(3+3+3)]$ . *Macrodera* is now shown by the excretory system to belong in the Ochetsomatoidea, family Ochetsomatidae, subfamily Macroderinae. G. I. Pozniak

**2544**—OSHMARIN, P. G., 1960. [Dalnevostochnii filial Sibirskogo otdelenia Akademii nauk SSSR Vladivostok, U.S.S.R.] [The functional significance and origin of the differentiation of the trichuroid body into a filiform anterior and a thicker posterior portion.] **Zoologicheskii Zhurnal**, **39** (7), 1091–1092. [In Russian: English summary p. 1092.]

Oshmarin, discussing the functional significance of the body shape in trichuroids, considers that a filamentous body aids attachment if the worm lives within tissues, e.g. capillariids, and is further of advantage when feeding occurs by sucking in substances through the body surface as described by Müller in 1929. The next stage in development is seen in trichurids where the body is in two parts, the anterior filamentous part retaining the functions mentioned above, and the wide posterior part having become adapted to accommodate the more developed reproductive organs. G. I. Pozniak

**2545**—RAWSON, D. & RIGBY, J. E., 1960. [Department of Biology, Queen Elizabeth College, Campden Hill Road, London, W.8., England.] "The functional anatomy of the cysticeroid of *Choanotaenia crassicolex* (Linstow 1890) (Dilepididae) from the digestive gland of *Oxychilus cellarius* (Müll) (Stylommatophora), with some observations on developmental stages." **Parasitology**, **50** (3/4), 453–468.

Rawson & Rigby describe and figure the cysticeroid of *Choanotaenia crassicolex* from *Oxychilus cellarius*. The authors consider that the tail of the third-stage larva becomes incorporated into the bladder, rather than being cast off as supposed by other workers. A comparison of the measurements of this larva obtained from five different sources as cited by various authors is tabulated. The functional anatomy of the third-stage larva is given in some detail. The adhesive organs of the first-stage larva resemble tetraphyllidian bothridia which fact, together with the presence of a mobile "tail", leads Rawson & Rigby to regard this larva as equivalent to a normal plerocercoid stage. J. W. Smith

**2546**—ROTHMAN, A. H., 1960. "Ultramicroscopic evidences of absorptive function in cestodes." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 10.



- 2547—SCHILLER, E. L., 1960. "The histogenesis of cuticle in the cestode genus *Taenia*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 9–10.

Histological studies of *Taenia cysticerci* from the livers of *Tamiasciurus hudsonicus* have shown cuticle formation to be preceded by the differentiation of two types of cells directly beneath the embryonic membrane. The first type are nucleated, elongated, tapered at each end and lie perpendicular to the body surface; branched fibrillar processes extend from these; interspersed amongst these are gland-like cells. Cuticle formation appears to be by folding of the embryonic membrane with the deposition of a cement substance, presumably by the gland-like cells, between the interfibrillar processes. It is suggested that the subcuticular nucleated cells represent embryonic ectoderm.

S. Willmott

- 2548—VOGE, M., 1960. "Observations on the structure of cysticeroids." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 10.

The cysticeroids of *Hymenolepis diminuta*, *H. nana*, *H. citelli*, *Raillietina cesticillus* and *Choanotaenia infundibulum* have been shown to contain fibrous tissue which resembles vertebrate connective tissue in its staining reactions.

S. Willmott

- 2549—VOGE, M., 1960. [Department of Infectious Diseases, School of Medicine, University of California, Los Angeles, California, U.S.A.] "Studies in cysticeroid histology. IV. Observations on histogenesis in the cysticeroid of *Hymenolepis diminuta* (Cestoda: Cyclophyllidae)." **Journal of Parasitology**, 46 (6), 717–723, 724–725.

The major histological changes which occur during the normal development of *Hymenolepis diminuta* are described. Voge states that one of the most interesting problems involves the origin of the fibrous tissue, spindle-shaped cells being connected with the formation of the fibres. It is not known whether fibres are produced by a redistribution of the protoplasm of various spindle-shaped and star-shaped cells or are formed from their secretions. Flame cells were observed in the scolex but in other regions long cord-like structures may function in excretion.

H. H. Williams

- 2550—VOGE, M., 1960. [Department of Infectious Diseases, School of Medicine, University of California, Los Angeles, U.S.A.] "Studies in cysticeroid histology. III. Observations on the fully developed cysticeroid of *Raillietina cesticillus* (Cestoda: Cyclophyllidae)." **Proceedings of the Helminthological Society of Washington**, 27 (3), 271–274.

The results obtained by Voge from histological studies on the cysticeroid of *Raillietina cesticillus* differ from those recorded by Wetzel (1934) [for abstract see Helm Abs., 3, No. 297a]. According to Voge there is no evidence to support the statement that the cysticeroid is surrounded by a thin cuticle-like envelope probably furnished by the host. The term "posterior fold" is used for the structure described by Wetzel as the excretory bladder since there is no evidence that it is connected with excretion. Reference is made to the large number of small granules which occur in the tissues outside the cysticeroid cavity and it is stated that in the past many small bodies in tapeworm tissues have been called calcareous corpuscles on the basis of insufficient evidence.

H. H. Williams

- 2551—WILLIAMS, H. H., 1960. [Department of Zoology, University College of Wales, Cardiff, South Wales.] "Some observations on *Parabothrium gadi-pollachii* (Rudolphi, 1810) and *Abothrium gadi* van Beneden 1870 (Cestoda: Pseudophyllidae) including an account of their mode of attachment and of variation in the two species." **Parasitology**, 50 (3/4), 303–322.

An account is given of the occurrence of *Parabothrium gadi-pollachii* and *Abothrium gadi* in *Gadus pollachius*, *G. aeglefinus* and *G. callarias* caught in the eastern Atlantic. The external features, musculature, excretory, nervous and genital systems of the two cestodes are described in detail. The adults of both species are characterized by the absence of a typical pseudophyllidean scolex and possess interesting modes of attachment to the intestine and caeca. The scolex deformatus of *P. gadi-pollachii* possesses a permanent bulbous swelling which may play an important part in attaching the anterior end of the cestode within a caecum. It is suggested that the longitudinal grooves or corrugations of the body wall which are characteristic of both *P. gadi-pollachii* and *A. gadi* may also function as organs of attachment because the two species were sometimes found weakly adhering along their lengths to the

mucosa. Specimens of *A. gadi* from the cod and haddock show a wide variation in size and shape of the segments, size, shape and number of testes, size and shape of the ovary but a segregation of the material into two distinct species is not undertaken because a wide range of morphological variation is known to occur in other members of the Pseudophyllidea.

H. H. Williams

- 2552—YOKOO, T., 1960. [Faculty of Agriculture, Saga University, Saga-shi, Saga-ken, Japan.] [Some notes on the numbers of constrictions occurring on the tail region of larvae of the southern cotton root-knot nematode, *Meloidogyne incognita* var. *acrita*.] **Agricultural Bulletin, Saga University**, No. 10, pp. 121–123. [In Japanese: English summary p. 121.]

In order to study the morphological differences between second-stage larvae of species of *Meloidogyne*, Yokoo counted the number of constrictions located on both dorsal and ventral sides of the tail region of *M. incognita* var. *acrita* larvae. 63 of 112 specimens examined were found to have one constriction on each side and 16 specimens had one on the ventral and two on the dorsal side. No specimens without constrictions on the tail region were observed; one specimen had as many as three constrictions on each side of the tail.

M. Ichinohe

- 2553—YOKOO, T., MATSUNOBE, K. & ÔTA, Y., 1960. [Faculty of Agriculture, Saga University, Saga-shi, Saga-ken, Japan.] [On the variations of dimensions within soil nematodes. 2. Dimensions of the suspected plant parasitic nematode, *Aphelenchus avenae*, and the bud or leaf nematode, *Aphelenchoides fragariae*.] **Agricultural Bulletin, Saga University**, No. 10, pp. 125–136. [In Japanese: English summary p. 135.]

Yokoo *et al.* studied the variation in the measurements of nematodes within species by using *Aphelenchus avenae* and *Aphelenchoides fragariae*. Comparisons of the variations were made based upon the ratio of the standard deviation to the average. It was found that the smallest variation was V-value in the female and T-value in the male. The ratio of the standard deviation to the average measurements including  $\alpha$ ,  $\beta$ ,  $\gamma$ , body length, body width, tail length, etc. ranged from 10 : 100 to 15 : 100 in both species examined.

M. Ichinohe

### Life-history and Development

- 2554—ADAMS, J. E. & MARTIN, W. E., 1960. "Life history of *Himasthla* sp., an echinostome trematode." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 15.

*Cerithidea californica* was found naturally infected with *Himasthla* sp. Gravid adults were recovered from chicks 17 or more days after they had been fed encysted metacercariae. Eggs obtained from these were incubated in sea-water at room temperature. Miracidia hatched after 18 days.

S. Willmott

- 2555—ALICATA, J. E. & CHING, H. L., 1960. "On the infection of birds and mammals with the cercaria and metacercaria of the eye-fluke, *Philophthalmus*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 16.

Alicata & Ching exposed young chickens, rabbits and rats to cercariae or excysted metacercariae of *Philophthalmus* sp. from naturally infected *Tarebia granifera mauliensis*. The larvae were transferred to the eye or the back of the mouth by means of a pipette. Both birds and mammals became infected by the ocular route and birds also by the oral route.

S. Willmott

- 2556—ASH, L. R., 1960. "Life cycle studies on *Gnathostoma procyonis* Chandler, 1942, a nematode parasite of the raccoon." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 37.

In the life-cycle of *Gnathostoma procyonis* two moults occur in the copepod and the third-stage larva is infective only to fish. Growth and differentiation must occur before the mammalian host can be infected. Snakes, turtles and other cold-blooded vertebrates can act as paratenic hosts. The third-stage larvae encapsulate in the muscles of rats and mice without undergoing morphological change and then migrate through the tissues to the stomach where they become mature in about three months. The differences from *G. spinigerum* are described.

S. Willmott



- 2557**—ASH, L. R., 1961. [Tulane University, U.S.A.] "The life cycle and epidemiology of *Gnathostoma procyonis* Chandler, 1942, a nematode parasite of the raccoon." **Dissertation Abstracts**, 21 (8), 2408.

[For abstract of account of part of this work see No. 2556 above.]

- 2558**—BARBOSA, F. A. S., 1960. [University of Recife, Pernambuco, Brazil.] "Alguns aspectos das relações hospedeiro-parasito entre as fases larvárias do trematódeo *Schistosoma mansoni* e o molusco *Australorbis glabratus*." **Boletim da Fundação Gonçalo Moniz. Bahia**, No. 15, 44 pp. [English summary pp. 41–42.]

Barbosa studied host-parasite relationships of the larval stages of *Schistosoma mansoni* and *Australorbis glabratus*. He noted that the miracidium will penetrate many aquatic snails and even tadpoles which are not suitable for its further development and that there is therefore no specific attraction exerted by suitable hosts only. He also studied miracidial hatching under different laboratory conditions, survival of infected snails and shedding of cercariae at various temperatures and the survival of sporocysts in snails subjected to varying periods out of water.

W. M. Fitzsimmons

- 2559**—BEARUP, A. J., 1960. [School of Public Health and Tropical Medicine, University of Sydney, New South Wales, Australia.] "Life history of *Acanthoparyphium spinulosum* Johnston, 1917 (Trematoda: Echinostomatidae)." **Australian Journal of Zoology**, 8 (2), 217–225.

The cercariae commonly found in the estuarine gastropod, *Pyrazus australis*, are listed. The life-history of one of these, *Acanthoparyphium spinulosum*, is described. No sporocysts were found. Two generations of rediae precede the cercariae which have a head collar bearing 23 spines in a single row, as in the adult. Cercariae encyst readily in *Salinator fragilis*. A few cysts were found in *P. australis* and also in small polychaetes of the *Phanaerocephala* group. Adults were obtained experimentally by feeding infected specimens of *S. fragilis* to the silver gull, *Larus novae-hollandiae*.

M. Beverley-Burton

- 2560**—BEREZANTSEV, Y. A., 1960. [Katedra obshchei biologii i parazitologii, Voenno-meditsinskaya Akademiya im. S. M. Kirova, Leningrad, U.S.S.R.] [The role played by rodents and insectivores in maintaining natural foci of trichinellosis.] **Zoologicheskii Zhurnal**, 39 (6), 832–837. [In Russian: English summary p. 837.]

Berezantsev has studied the possible passage of *Trichinella* within natural forest foci of the infection, with particular reference to the feeding habits of some of the animals. He concludes that rodents and some insectivores (e.g. shrews) constitute one of the links and presents in a diagram the various possible paths in the transmission of this infection. Moles (as shown in a field experiment) and necrophagous insects are apparently of no importance.

G. I. Pozniak

- 2561**—BERRIE, A. D., 1960. [Department of Zoology, Makerere College, P.O. Box 262, Kampala, Uganda.] "The influence of various definitive hosts on the development of *Diplostomum phoxini* (Strigeida, Trematoda)." **Journal of Helminthology**, 34 (3/4), 205–210.

Infection with the metacercariae of *Diplostomum phoxini* is common in *Phoxinus phoxinus* in the Glasgow area of Scotland. The first intermediate host of *D. phoxini* in this area is *Lymnaea peregra*. Berrie shows that significant differences occur between adult flukes recovered from different host species (experimentally infected mice, ducklings and herring gull chicks). Since adult flukes attain their greatest size and sexual development in gulls the author suggests that these may be the natural definitive host for *D. phoxini* in the west of Scotland.

J. W. Smith

- 2562**—BERRIE, A. D., 1960. [Department of Zoology, Makerere College, P.O. Box 262, Kampala, Uganda.] "Two *Diplostomulum* larvae (Strigeida, Trematoda) in the eyes of sticklebacks (*Gasterosteus aculeatus* L.)." **Journal of Helminthology**, 34 (3/4), 211–216.

Berrie collected 20 *Lymnaea peregra* from Mossend, Lanarkshire and found six were infected with *Cercaria* C and two others with some other, unidentified strigeid cercariae. *Gasterosteus aculeatus* were experimentally infected with both types of cercaria. The fish exposed to

*Cercaria C* developed small metacercariae within the lens of the eye; those exposed to the other type developed small metacercariae within the retina. Berrie states that each species exhibited a strong habitat selection within the eye, irrespective of the absence or presence of the other. Ducklings separately fed both types of metacercaria developed adults within four days. Under cold winter conditions no transmission of cercariae occurs from snails to fish in the field.

J. W. Smith

- 2563—BRAY, R. L. & WALTON, B. C., 1961. [Talcott Hill Road, Coventry, Connecticut, U.S.A.] "The life cycle of *Dirofilaria uniformis* Price and transmission to wild and laboratory rabbits." *Journal of Parasitology*, **47** (1), 13–22, 23.

*Anopheles quadrimaculatus*, *Aedes aegypti*, *A. sollicitans* and *Culex pipiens* were fed on a cotton-tail rabbit (*Sylvilagus floridanus mallurus*) infected with *Dirofilaria uniformis*. Only *Anopheles quadrimaculatus* became infected. The infective stage was reached between the seventh and ninth days. Subcutaneous injections of infective larvae produced microfilaraemia in 12 of 14 wild rabbits and in eight of 18 laboratory rabbits, the latter requiring larger doses to produce infections. The pre-patent period ranged from 97 to 222 days and was inversely proportional to the numbers of larvae injected. The highest numbers of microfilariae were recovered from the blood between 4 p.m. and midnight, the peak coinciding with the biting period of *A. quadrimaculatus*. There are four charts and one plate with four photomicrographs.

N. Jones

- 2564—CHERNIN, E., 1960. [Department of Tropical Public Health, Harvard School of Public Health, Boston, Massachusetts, U.S.A.] "Infections of *Australorbis glabratus* with *Schistosoma mansoni* under bacteriologically sterile conditions." *Proceedings of the Society for Experimental Biology and Medicine*, **105** (2), 292–296.

Chernin has successfully infected *Australorbis glabratus* grown under axenic conditions with bacteriologically-sterile miracidia of *Schistosoma mansoni*; parallel experiments carried out with aquarium-reared snails showed the larval development of the parasite in axenic snails to be normal. Maintenance of the snails in the dark for extended periods did not affect larval development. The life-cycle of the parasite was successfully completed by infecting mice with cercariae from the axenic snails; miracidia recovered under sterile conditions from schistosome eggs found in the livers of mice were infective to axenic snails. Mortality of aquarium-reared snails was higher than that of axenic snails; mortality of infected axenic snails was higher than that of uninfected axenic snails. Infected axenic snails tended to grow more rapidly than uninfected axenic snails fed the same food under controlled conditions.

J. W. Smith

- 2565—CHING, H. L., 1960. [Parasitology Department, Agricultural Experiment Station, University of Hawaii, Honolulu 14, Hawaii.] "Studies on three hemiuroid cercariae from Friday Harbor, Washington." *Journal of Parasitology*, **46** (5), 663–670.

*Cercaria A* Miller, 1925 was found in *Thais emarginata* and *T. canaliculata*, *Cercaria B* Miller, 1925 in *T. lamellosa* and *Cercaria prenanti* in *Dentalium dalli*; this is a new host for *C. prenanti*. Copepods (*Tigropus californicus*) were successfully infected with cercariae *A* and *B*, but not with *C. prenanti*; infected copepods failed to infect young fishes. The embryology of *Cercaria A* and the growth and development of metacercariae *A* and *B* were observed in copepods. The metacercaria of *Cercaria A* resembles *Lecithaster salmonis* and *Cercaria B* resembles the larva of *L. confusus*.

N. Jones

- 2566—CRUSZ, H. & SATHANANTHAN, A. H., 1960. [Department of Zoology, University of Ceylon, Colombo, Ceylon.] "Metacercaria of *Transversotrema patialense* in the fresh-water fish *Macropodus cupanus*." *Journal of Parasitology*, **46** (5), 613.

The metacercaria of *Transversotrema patialense* has been found, for the first time, in one of four *Macropodus cupanus* from channels irrigating rice fields in Ceylon. It is mentioned, inter alia, that *Cercaria patialensis* had been previously found by Crusz in 40% of *Melanoides tuberculata* from rice fields.

N. Jones



- 2567**—DAWES, B., 1960. [Department of Zoology, King's College, London, W.C.2, England.] "Penetration of *Fasciola gigantica* Cobbold, 1856 into snail hosts." [Correspondence.] *Nature*, **London**, **185** (4705), 51-53.

The penetration of the miracidium of *Fasciola gigantica* into *Lymnaea rufescens*, *L. natalensis* and *L. acuminata* and of *Schistosoma mansoni* into *Australorbis glabratus* is a process closely similar to that of *F. hepatica* into *L. truncatula*, previously described by Dawes in 1959 [for abstract see Helm. Abs., **29**, No. 1462]. While the cytolytic secretion of the miracidium is acting on the epithelium of the mollusc the miracidium is undergoing metamorphosis into the sporocystic stage. Dawes believes that this process may prove to be constant in all those digenetic trematodes which have a ciliated miracidium. The various stages of penetration are convincingly illustrated by eight photomicrographs. R. T. Leiper

- 2568**—DEBLOCK, S., 1960. [Laboratoire de Parasitologie, Faculté de Médecine, Pharmacie de Lille, France.] "De quelques identités vraisemblables concernant des métacercaries de microphallidés d'Europe occidentale." *Annales de Parasitologie Humaine et Comparée*, **35** (4), 672-674.

From a detailed examination of material collected on the coast of the English Channel, Deblock has now been able to attribute to their respective adults six of the metacercariae described by Lebour (1907-14). Thus *Metacercaria corophii* could be attributed to *Microphallus claviformis*, *Metacercaria balani* to *Maritrema arenaria*, *Metacercaria carcini* to *Microphallus similis*, *Metacercaria minor* to *Maritrema subdolum*, *Metacercaria ligiae* to *Maritrema linguilla* and *Metacercaria carcini* resembles *Microphallus canchei* more closely than it does *M. similis*. However, despite the fact that the morphology, dimensions and nature of the hosts of the metacercariae, as well as the size of the excysted ones correspond, the author declines to make any changes in the nomenclature in order to avoid confusion. N. Jones

- 2569**—DINNIK, J. A. & DINNIK, N. N., 1960. [East African Veterinary Research Organization, Muguga, Kenya.] "Development of *Carmyerius exoporus* Maplestone (Trematoda: Gastrothylacidae) in a snail host." *Parasitology*, **50** (3/4), 469-480.

Dinnik & Dinnik describe, with figures, the development of *Carmyerius exoporus* in *Anisus natalensis*. Of 25 to 32 germinal cells present in the miracidium only six to eleven develop in the sporocyst, of which three to nine develop into rediae of the first generation. Rediae of the first, second and subsequent generations give birth to daughter rediae and cercariae. There is no alternation in the development of redial and cercarial embryos. The cercariae leave their parent rediae when immature and continue their development in the snail tissue. The authors discuss the similarities between larval development in the Gastrothylacidae and in the Paramphistomatidae. J. W. Smith

- 2570**—DISSANAIKE, A. S. & FERNANDO, C. H., 1960. [Department of Parasitology, University of Ceylon, Colombo, Ceylon.] "Parathelphusa ceylonensis C. H. Fern, second intermediate host of *Pleurogenoides sitapurii* (Srivastava)." *Journal of Parasitology*, **46** (6), 889-890.

The metacercariae found by Dissanaïke & Fernando in over 90% of *Parathelphusa ceylonensis* from a paddy field in Nugegoda, Ceylon, have been reared to the adult in *Rana hexadactyla* and identified as *Pleurogenoides sitapurii*; *R. cyanophlyctis* from the same locality as the crabs have been found naturally infected. Xiphidiocercariae which emerged from numerous snails collected in the same area (mostly *Indoplanorbis exustus*) are thought to be *P. sitapurii*. This is the first record of *Pleurogenoides* from Ceylon. The metacercaria and adult are briefly described and figured. J. W. Smith

- 2571**—DUXBURY, R. E., MOON, A. P. & SADUN, E. H., 1960. "Susceptibility and resistance of *Anopheles quadrimaculatus* to *Dirofilaria uniformis*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 27-28.

To ensure routine transmission of *Dirofilaria uniformis* in *Anopheles quadrimaculatus* the optimum microfilaraemia was from 100 to 150 per 0.02 ml. of blood. After 10 to 12 days the distribution of 12,765 infective larvae in 508 mosquitoes was: head 54%, thorax 20%, abdomen 26%. More larvae were recovered from mosquitoes kept at 27°C. than at 24°C. or 31°C. An inverse relationship was observed between the age of mosquitoes when infected and the number and length of larvae developing three, six and nine days later. S. Willmott

- 2572—EDESON, J. F. B., WHARTON, R. H. & LAING, A. B. G., 1960. [Institute for Medical Research, Federation of Malaya.] "A preliminary account of the transmission, maintenance and laboratory vectors of *Brugia pahangi*." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **54** (5), 439–449.

Edeson *et al.* describe the experimental transmission of *Brugia pahangi* (Buckley & Edeson, 1956) Buckley, 1960 to various animals and of the relative efficiency of various species of mosquitoes as vectors. The donor animals were domestic cat, slow loris (*Nycticebus coucang*) and the civet cat (*Paradoxurus hermaphroditus*). Inoculation of animals was mainly by subcutaneous injection of infective larvae obtained from mosquitoes but was, on one occasion, performed by mosquito bite. The animals used and the results therefrom are as follows: long-tailed macaque (*Macaca irus*)—five of these monkeys were inoculated but none became infected; short-tailed macaque (*M. nemestrina*)—one inoculated and did not become infected; Rhesus (*M. rhesus*)—one inoculated and did not become infected; slow loris (*Nycticebus coucang*)—two inoculated and both became infected; domestic cat—29 inoculated and 11 which survived longer than 59 days all became infected; in 18 which died during the pre-patent period, developing larvae were found; civet cat (*Paradoxurus hermaphroditus*)—two inoculated and one became infected. Other animals inoculated and which did not become infected with mature parasites were two squirrels (*Callosciurus* spp.), six tree shrews (*Tupaia glis*) and four guinea-pigs. The pre-patent period in cats (59–83 days) was shorter than in civet cat (96 days) and the slow loris (91 days). The rate of development was similar to that observed for *B. malayi*. The mosquitoes used in the transmission work were mainly *Armigeres obturbans* which is a very efficient host. *Mansonia annulatus* was also found to be a good host, *M. uniformis* not so good and *M. longipalpis* relatively poor. Development to the infective stage was observed in *M. crassipes*, *Anopheles barbirostris*, *A. umbrosus*, *Aedes aegypti* and *Culex fatigans*.  
J. J. C. Buckley

- 2573—ERHARDOVÁ, B., 1960. [Biologický ústav ČSAV—parasitologie, Na cvičišti 2, Praha 6, Czechoslovakia.] "K vývojovým cyklům některých geohelmintů." *Věstník Československé Zoologické Společnosti*, **24** (4), 361–370. [German summary p. 369.]

Erhardová has studied the life-cycles of *Heligmosomum costellatum*, *H. skrjabini*, *Strongyloides myopotami* and *S. ratti*. The last two species were also used in experimental infections of white mice and white rats but the infections were successful only with *S. ratti* and only through the skin. Larvae, given per os, died in the stomach within one hour. When there was excessive contamination of the cultures by fungi or bacteria only 0% to 3% of larvae developed to maturity in the host, as compared with 30% to 40% of larvae from normal cultures. Old cultures also gave negligible results. Attempts to infect 9 to 12-month-old mice failed but subsequently younger mice were infected.  
N. Jones

- 2574—EWERS, W. H., 1961. [School of Biological Sciences, University of New South Wales, Sydney, Australia.] "A new intermediate host of schistosome trematodes from New South Wales." [Correspondence.] *Nature, London*, **190** (4772), 283–284.

Ewers found 35 of 100 *Siphonaria denticulata* from Cape Banks, Sydney, infected with schistosome cercariae capable of causing a typical dermatitis in man; this area is often crowded with *Larus novae-hollandiae* at low tide. Five of 25 *Melopsittacus undulatus* exposed to these cercariae developed immature schistosomes in the lungs or the liver; the worms appeared to belong to the Bilharziellinae.  
J. W. Smith

- 2575—GRABDA, B., 1960. [Zakład Parazytologii, Polska Akademia Nauk, Warszawa, Pasteura 3, Poland.] "Life cycle of *Haematoloechus similis* (Looss, 1899) (Trematoda—Plagiorchiidae)." *Acta Parasitologica Polonica*, **8** (21/32), 357–367. [Polish summary p. 367.]

The life-cycle of *Haematoloechus similis* has been traced experimentally; the sporocyst, cercaria, metacercaria and adult are described and figured. The first intermediate host, *Planorbis planorbis*, was experimentally infected with eggs; 40 days later mature sporocysts and cercariae were recovered. The metacercariae, which do not encyst and which are sometimes over 2 mm. in length, are found in the larvae of several species of *Coenagrion*. Adult flukes were obtained from *Rana esculenta*. The cercariae of *H. similis* resemble those of the group "Prima" of the "*Cercariae ornatae*" in size and body proportions but also resemble those of the "*Cercariae*



*armatae*” group in the nature of the excretory system and in the absence of a caudal finfold; the cercariae of *H. similis* differ from those of both groups by possessing prominent penetration glands and by the absence of cystogenous glands.

J. W. Smith

**2576**—HOFFMAN, G. L., 1960. “Synopsis of Strigeoidea (Trematoda) of fishes and their life cycles.” *Fishery Bulletin of the Fish and Wildlife Service, Washington*, **60** (175), 439–469.

This synopsis includes an account of the known life-cycles of those strigeoids which have fish as their second intermediate hosts. A list of those strigeoids that have been experimentally reared to the adult stage is given and a routine method of examining fish for strigeoid metacercariae is outlined. The parasites are placed under four metacercarial groups, namely, *Tetracotyle*, *Diplostomulum*, *Neascus* and *Prohemistomulum*; keys are given to the North American species of the first three only. There are 36 figures and 98 references.

J. W. Smith

**2577**—HUNTER, W. S. & VERNBERG, W. B., 1960. [Duke University, Durham, North Carolina, U.S.A.] “Preliminary studies on the life history of *Cardiocephalus brandesi* Szidat, 1928 (Trematoda: Strigeidae).” *Journal of Parasitology*, **46** (6), 797–799.

Hunter & Vernberg found unencysted and encysted metacercariae in the brains and eyes of *Menidia menidia* and *Mugil cephalus*. When fed to *Rhynchops nigra nigra* and *Sterna hirundo hirundo* they developed into *Cardiocephalus brandesi*. Experimental work suggests that *Cercaria nassa*, which develops in *Nassarius obsoleta*, is the larval stage of *Cardiocephalus brandesi*.

E. I. Sillman

**2578**—ILES, C., 1960. [Zoology Department, University College, Cardiff, South Wales.] “The larval trematodes of certain fresh-water molluscs. II. Experimental studies on the life-cycle of two species of furcocercariae.” *Parasitology*, **50** (3/4), 401–418.

Iles describes the development of the tetracotyle metacercaria of *Cercaria tetraglandis* and that of the metacercaria and adult of *Apatemon gracilis minor*. *C. tetraglandis* emerges from *Planorbis corneus* and penetrates into leeches (*Erpobdella*, *Glossiphonia*, *Protocleipsis*), in which the metacercariae come to rest largely within the dorsal and lateral surface musculature. *A. gracilis minor* cercariae emerge from *Lymnaea peregra* and penetrate the same leech species, but the metacercariae were found to be distributed throughout the whole body, usually close to the blood vessels. Ovigerous adult *A. gracilis minor* were obtained as early as ten days after feeding experimentally infected leeches containing metacercariae to Khaki Campbell ducklings; metacercariae did not develop in rats.

E. I. Sillman

**2579**—JANISZEWSKA, J., 1960. [Muzeum Zoologiczne Instytutu Zoologicznego, Uniwersytet Wrocławski, Wrocław, ul. Sienkiewicza 21, Poland.] “Studies on larval nematodes parasitic in Tubificidae. (A hypothesis on the life-cycle of Rhabdochoniidae.)” *Acta Parasitologica Polonica*, **8** (21/32), 419–425. [Polish summary p. 425.]

Janiszewska describes and figures the second-stage larva of a nematode from the body-cavities of *Tubifex tubifex* and *Limnodrilus hoffmeisteri*; the larvae ranged from 210  $\mu$  to 270  $\mu$  in length and showed features ascribing them to the Rhabdochoniidae of the suborder Spirurata. Further study may show them to be the larvae of *Rhabdochonoides barbi*. The author speculates on the life-history of Rhabdochoniidae making reference to other published work.

J. W. Smith

**2580**—KORATHA, K. J. & MARTIN, W. E., 1960. “Preliminary report on the life history of monogenetic trematodes with observations on the survival of adults outside the host.” [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 14–15.

The eggs of 15 species of Monogenea and the oncomiracidia of seven are reported and briefly annotated and their hosts are given. Some are new species but these are neither named nor described in this authors’ abstract.

S. Willmott

**2581**—KOZICKA, J., 1960. [Zakład Parazytologii, Polska Akademia Nauk, Warszawa, Pasteura 3, Poland.] “Metacercaria *Neodiplostomum pseudattenatum* (Dubois, 1928) Dubois, 1932, syn. *Neodiplostomulum scardinii* Schulman (in Dubinin 1952).” *Acta Parasitologica Polonica*, **8** (21/32), 369–377. [Polish summary p. 377.]

Kozicka gives an illustrated, detailed description of the structure and development of the metacercaria of *Neodiplostomum pseudattenatum* which was found in cyprinid fish and fry,

particularly *Scardinius erythrophthalmus*, from several lakes in Mazuria, this being a new record for Poland. The encysted metacercariae are found in the brain cells and ependymal brain layer and, occasionally, in the eyes. Cysts rarely appear singly, usually adhering to one another in groups. Kozicka has discussed the pathogenicity of this metacercaria in fish and its effect on the abundance of fry in an earlier work where it was referred to as *Neascus scardinii* [for abstract see Helm. Abs., 27, No. 180q]. J. W. Smith

2582—KULAKOVSKAYA, O. P., 1959. [The developmental stages of *Bathybothrium rectangulum* in *Barbus* spp. in different seasons of the year.] *Dokladi Akademii Nauk SSSR*, 127 (1), 227–229. [In Russian.]

The development has been studied of *Bathybothrium rectangulum* in *Barbus* (it is specific to *B. barbus* and *B. meridionalis petenyi*) in rivers of western Ukraine. Larvae (at the scolex stage and measuring 1.0 mm. to 1.5 mm.) were first observed in the fish in June to July. By August to September the worms were 1.0 cm. in length and had two bothria and in February to March they were 4.5 cm. to 5.0 cm. long and the sex organs were appearing; maturity was reached about May. The oval mature eggs measured 0.09 mm. to 0.12 mm. by 0.06 mm. to 0.07 mm. and contained an embryo with three pairs of hooks measuring 0.02 mm. in length. Old worms left the fish and these were often free of infection in early summer, but new infections may be acquired before the elimination of old ones. The intermediate host was not traced.

G. I. Pozniak

2583—LEE, H. F., 1960. "The life history of *Heterobilharzia americana*." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 34–35.

Of a large number of different snails examined only one *Lymnaea* sp. was found naturally infected with *Heterobilharzia americana*. *Lymnaea* sp. and *Pseudosuccinea* were successfully infected experimentally. The cercariae, miracidia and eggs closely resemble those of *Schistosomatum douthitti*. S. Willmott

2584—LEIGH, W. H., 1960. "The Florida spotted gar, as the intermediate host for *Odhneriotrema incommodum* (Leidy, 1856) from *Alligator mississippiensis*." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 16.

Large, orange capsules, which occurred primarily in the ovaries of *Lepisosteus platyrhincus*, were fed to five *Alligator mississippiensis*; all became infected with *Odhneriotrema incommodum*. The initial attachment of the trematode is at the junction of the pharynx and oesophagus from which it migrates later to the naso-pharynx or area adjacent to the glottis. The mode of nutrition of the parasite is discussed. The metacercariae show an unusual and marked affinity for female gar, 93 of 253 being infected compared with 18 of 214 males. S. Willmott

2585—LEVIN, N. L., 1961. [Department of Biology, Westminster College, Fulton, Missouri, U.S.A.] "Life history studies on *Porrocaecum ensicaudatum* (Nematoda), an avian nematode. I. Experimental observations in the chicken." *Journal of Parasitology*, 47 (1), 38–46.

Levin describes the life-cycle of *Porrocaecum ensicaudatum* which he has traced experimentally in chickens. There are 17 figures. The infective larvae are found in the ventral blood vessel and hearts of *Lumbricus terrestris*. The excretory pore of the larva opens a short distance behind the nerve ring. The genital anlage occurs as an ovoid mass ventral to the over-arching intestine just behind the middle of the body. A cuticular boring tooth is not apparent. 24-hour-old chickens were successfully infected with larvae. Exsheathing is complete 48 hours after infection and takes place when the larvae are situated between the horny layer and muscular wall of the gizzard. The female reproductive system begins to differentiate on the third day when the parasite is in the duodenal wall; rudimentary testes are present on the fifth day. The spicule pouch opens into the cloaca by the tenth day when preparation for the second moult can be seen; ecdysis is complete by the 14th day after infection. The nematodes begin to leave the intestinal tissue and enter the lumen on the 18th day. The author agrees that *Spiroptera turdi* is the larva of *P. ensicaudatum*.

J. W. Smith



**2586**—McCAULEY, J. E. & PRATT, I., 1960. "The life history of *Echinochasmus milvi* Yamaguti, 1939." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 15.

A zygocercous cercaria from *Oxytrema silicula* encysted loosely in the gills of sticklebacks and guppies. When fed to hamsters and ducks mature *Echinochasmus milvi* developed.

S. Willmott

**2587**—MALEK, E. A., 1960. "*Bulinus (Bulinus) forskalii* Ehrenberg, 1831: intermediate host of *Gastrodiscus aegyptiacus* (Cobbold, 1876) Looss, 1896." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 16.

**2588**—MARTIN, W. E. & ADAMS, J. E., 1960. "Life cycle of *Acanthoparyphium spinulosum* Johnston, 1917 (Echinostomatidae)." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 35.

*Cerithidea californica* from Newport Bay (California) was found infected with parthenitae of *Acanthoparyphium spinulosum*. 23 collar spines in one row were observed in the cercaria, metacercaria and adult. The flame cell formula of the cercaria is  $2[(2+2+2+2+2+2+2+2)+(2+2+2+2+2+2+2+2)]=64$ . Metacercariae encysted in *C. californica* and adults were obtained from experimentally infected chicks.

S. Willmott

**2589**—MEYER, F. P., 1960. "The life cycle of *Marsipometra hastata* (Linton, 1898) Cooper, 1917." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 18.

Gravid *Marsipometra hastata* from *Polyodon spathula* release large numbers of eggs which hatch in fresh water at a temperature above 60°F. The coracidia closely resemble those of other pseudophyllideans; below 55°F. the larvae are inactive. *Cyclops bicuspidatus* acts as intermediate host and small plerocercoids are formed within two weeks. Normal proceroid stages do not occur and there is no development of a cercomer. Stages recovered from the haemocoel of *Cyclops* resemble the smallest worms recovered from naturally infected *Polyodon* and it is thought that only one intermediary is required. *M. parva* is believed to be a valid species but the possible identity of *M. confusa* with *M. hastata* is discussed.

S. Willmott

**2590**—MYER, D. G., 1960. [Department of Zoology and Entomology, Ohio State University, Columbus, Ohio, U.S.A.] "On the life history of *Mesostephanus kentuckiensis* (Cable, 1935) n.comb. (Trematoda: Cyathocotylidae)." *Journal of Parasitology*, **46** (6), 819–832.

Myer reports the life-history of *Mesostephanus kentuckiensis* n.comb. (for *Cercaria kentuckiensis*) in nature to be: (i) first intermediary *Goniobasis livescens*; and (ii) second intermediaries, ten species of fish of three families, and tadpoles of *Rana clamitans* and *R. catesbeiana*. The natural definitive host is not known, but adults developed in experimentally infected chicks and not in snakes or raccoons. The daughter sporocyst, cercaria, metacercaria and adult are described and figured.

E. I. Sillman

**2591**—NADAKAL, A. M., 1960. "Observations on the life-cycle of *Avitellina centripunctata* (Rivolta, 1874), an anoplocephaline cestode from sheep and goats." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 12.

Although thousands of oribatid mites of the genera *Protoschelobates* and *Trichoribates* were exposed to eggs of *Avitellina centripunctata* only five oncospheres were recovered from the former and none from the latter. The oncospheres had not developed to the cysticeroid.

S. Willmott

**2592**—NADAKAL, A. M., 1960. [Department of Biology, Immaculate Heart College, Los Angeles, California, U.S.A.] "*Protoschelobates* sp., an oribatid mite from India, as a potential vector of the sheep tape worms *Moniezia benedeni* and *M. expansa*." *Journal of Parasitology*, **46** (6), 817.

Mites of the genus *Protoschelobates* when exposed in separate culture tubes to the eggs of *Moniezia benedeni* and *M. expansa* became infected with cysticeroids of both parasites. The incidence of infection was about 90% while the degree of infection sometimes reached 30 cysticeroids per mite. *Trichoribates* sp. similarly exposed were found to be unsuitable for the larval development of either cestode. A search for natural infections with cysticeroids proved negative.

N. Jones

- 2593—NASIR, P., 1960. [Parasitology Department, Wayne State University, Detroit, Michigan, U.S.A.] "Trematode parasites of snails from Edgbaston Pool: the life history of the strigeid *Cotylurus brevis* Dubois & Rausch, 1950." *Parasitology*, 50 (3/4), 551–575.
- Nasir describes the life-cycle of *Cotylurus brevis* from *Lymnaea stagnalis* in Edgbaston Pool, Birmingham, England. The egg, the cercaria and stages in the development of the tetracotyle larva are figured. The author compares the cercaria of *C. brevis* with *Cercaria helvetica* XXXIV Dubois and considers them to be identical. The cercaria of the closely related *Cotylurus cornutus* has 14 flame cells, whilst that of *C. brevis* has 20 flame cells. In nature *L. stagnalis* acts as both primary and secondary intermediate host for *C. brevis*. At least in the laboratory *L. peregra* and *L. auricularia* can act as second intermediate hosts, but *Planorbis corneus*, *P. carinatus* and various leeches cannot. The tetracotyle larva of *C. brevis* is morphologically indistinguishable from the corresponding stage of other species of *Cotylurus*. Nasir has successfully infected pigeons with tetracotyle larvae and has recovered the adult. Seventeen species of birds reported from Edgbaston Pool are listed. J. W. Smith
- 2594—NIEWIADOMSKA, K., 1960. [Zakład Parazytologii, Polska Akademia Nauk, Warszawa, Pasteura 3, Poland.] "On two cercariae of the genus *Tylodelphys* Dies.: *T. excavata* (Rud.) and *T. clavata* (Nord.) Diplostomatidae." *Acta Parasitologica Polonica*, 8 (21/32), 427–437. [Polish summary p. 437.]
- Niewiadomska describes and figures the cercaria *Tylodelphys excavata*. 6,678 specimens representing 16 species of snails from Lakes Gołdapiwo, Mamry Połnocne and Arklity (Mazuria) were examined for *T. excavata* but only nine of 532 *Coretus corneus* were infected. Szidat observed five pairs of flame cells whereas the present author has found nine pairs. A comparison of cercaria *T. excavata* with *Cercaria tenuis* shows them to be separate species. Experimental infection of *Rana esculenta* and *Bombina variegata* with *T. excavata* gave *T. rhachiaea* adults. Six of 227 *Radix ovata* from Lake Arklity were infected with *C. leiifera*; whereas Dubois and Wesenberg-Lund observed eight pairs of flame cells in this cercaria the present author has found 11 pairs. Niewiadomska compares *C. leiifera* with the description of *T. conifera* given by Ginetsinskaya and finds them to be identical. Furthermore, when *Perca fluviatilis*, *Rutilus rutilus* and *Carassius carassius* were experimentally infected with *Cercaria leiifera* the metacercariae of *T. clavata* (Nordmann, 1832) Diesing, 1850, developed in their eyes [see also abstract No. 2410 above]. J. W. Smith
- 2595—RAI, P., 1959. [Department of Parasitology, U.P. College of Veterinary Science & Animal Husbandry, Mathura, India.] "Observations on the development of the ova of *Parascaris equorum* Goetz, 1782 and its infection in guinea pig." *Indian Journal of Helminthology*, Year 1958, 10 (1), 56–63.
- Rai describes the embryonation of *Parascaris equorum* eggs. Guinea-pigs were infected with eggs and the ensuing lung and liver changes are described. Larvae were found in the liver, lung, trachea, stomach and small intestine. Measurements and drawings of larvae are shown. Rai considered that the larvae in the lungs and intestine were fourth-stage larvae [but his drawings do not support this conclusion]. J. F. A. Sprent
- 2596—SHTEIN, G. A., 1959. [Institut tsistologii Akademii nauk SSSR, U.S.S.R.] [The life-cycle and ecology of the nematode *Rhabdochona denudata* (Dujardin, 1845).] *Dokladi Akademii Nauk SSSR*, 127 (6), 1320–1321. [In Russian.]
- Larvae of *Rhabdochona denudata* are described and figured from the body-cavity of *Heptagenia* sp. (21.8% infected) and *Ephemerella* sp. (1.9% infected) in Lake Syamozera (Karelo Finnish A.S.S.R.) where this nematode is common in fish. This is the first record of intermediate hosts of *R. denudata* in the U.S.S.R. Infection of the insects was high in brackish waters with a high oxygen content and low temperatures but was absent in shallow calm waters. G. I. Pozniak
- 2597—SIDOROV, E. G., 1960. [Distribution of *Opisthorchis felinus* metacercariae amongst fish of the Irtysh river in the Pavlodar region.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, 12, 192–194. [In Russian.]
- Opisthorchis felinus* metacercariae were found in 96.1% of *Leuciscus idus*, 68.7% *L. leuciscus baicalensis*, 19.1% *Rutilus rutilus lacustris* and 77% of *Tinca tinca*. The diagnosis was



confirmed by infecting guinea-pigs. Altogether 885 fish were examined, mainly of marketable size, belonging to 14 species from the Irtysh river of the Pavlodar region. The total incidence of this parasite among 95 specimens under a year old of *L. idus*, *L. leuciscus baicalensis* and *R. rutilus lacustris* was 32.7%.

N. Jones

**2598**—SINHA, P. K. & SRIVASTAVA, H. D., 1960. [Bengal Veterinary College, Calcutta 37, India.] "Studies on *Schistosoma incognitum* Chandler, 1926. II. On the life history of the blood fluke." *Journal of Parasitology*, **46** (5), 629–641.

In their first paper of this series, Sinha & Srivastava dealt with the morphology and synonymy of adult *Schistosoma incognitum* [for abstract see Helm. Abs., **25**, No. 125d]. The authors now describe in detail the morphology and development of the egg, miracidium, sporocyst and cercaria of *S. incognitum*. 18 figures are given. When passed in the host's faeces the egg contains a fully formed miracidium. The "shoulders" observed by Rao (1957) in the miracidium were not seen. Hatching is markedly affected by temperature; some eggs hatch 10 minutes to one hour after dilution of the faeces, other take two to three days. The flame cells of the miracidium are active even in eggs still within the host's tissues. *Lymnaea luteola* var. *australis*, the natural intermediate host, was the only snail successfully infected experimentally. *L. acuminata* attracted miracidia but was not infected. Miracidia usually enter the snail through the head and anterior end of the foot, not through the respiratory pore. Sporocysts develop five to seven days after infection; early daughter sporocysts can be seen after seven to ten days. Fully developed cercariae are liberated on the 24th day after infection. The flame cell formula of the cercaria is  $2[2+2(+1)]=8(+2)$ . The differences between the cercariae of *S. incognitum* and *S. spindalis* are given. The cercariae of *S. incognitum* are found only near the surface of water where they hang with their furci touching the surface. The cercariae enter the final host through the mouth, skin or mucous membranes and develop into adults in the hepatic, portal and mesenteric veins within 36 days.

J. W. Smith

**2599**—SOKOLOVA, I. B. & PANIN, V. Y., 1960. [The intermediate hosts of *Moniezia*, *Thysaniezia* and *Avitellina* in Kazakhstan.] *Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR*, **12**, 145–149. [In Russian.]

Experimental infection of 7,000 oribatid mites of 15 species revealed that *Schelorbitates laevigatus* and, for the first time, *Punctoribates hexagonus* are intermediate hosts of *Moniezia expansa* and that *Zygoribatula frisiae*, *Z. cognata* and *Z. longiporosa* are intermediaries of *M. benedeni*. Similar exposure of 3,170 oribatid mites belonging to 17 species to the oncospheres of *Thysaniezia giardi* gave negative results. *S. laevigatus*, reported by Potemkina (1944) as an intermediate host of this cestode, was also negative. Proglottides of *Avitellina* were used in an attempt to infect 5,700 oribatids (nine species) in the laboratory, and ants (*Acantholepis melas* and *Messor minor denticulus*) under natural conditions. Dissection of the mites and of 8,500 ants four to five months later gave negative results. Attempts to infect molluscs (*Helicella candacharica*, *Pupilla sterri* and *Valonia costata*) were unsuccessful, the *Avitellina* eggs being passed in the faeces. In a search for natural infections with *Avitellina*, 1,000 mites, 8,500 ants belonging to six species, 100 coprophagous beetles (*Gymnopleurus* and *Lethrus*) and 700 wood-lice were examined with negative results.

N. Jones

**2600**—STIREWALT, M. A., 1960. "Changes in schistosome larvae and in mouse host skin during migration of the parasites." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 21.

**2601**—TIMON-DAVID, J., 1959. [Faculté des Sciences de Marseille, Laboratoire de Biologie Animale S.P.C.N., Marseille, France.] "Recherches sur les kystes à *Brachylaemus* du cylostome." *Annales de Parasitologie Humaine et Comparée*, **34** (3), 271–287.

Timon-David reports further work on the encysted *Brachylaemus* metacercariae which he first recorded from *Cyclostoma elegans* in Provence in 1954 [for abstract see Helm. Abs., **23**, No. 101a]. The wide distribution of this infection in the area and the high proportion of infected molluscs excludes the possibility of it being an accidental infection; *C. sulcatum* was never found infected. All metacercariae were encysted, most frequently in the diverticula of the pedal glands, and provoked a strong host reaction; no other larval stages were ever

observed in *C. elegans*. The external wall of the cyst was full of melanic pigment. The metacercariae could be easily removed from the cyst and are described and figured. Adults were obtained in pigeons and, more easily, in white mice; immature forms were recovered from the last part of the small intestine six hours after the infective feed and development was complete at the end of seven days. The measurements of the adults from mice and pigeons are given and the systematic position is discussed. Mice naturally infected with *Catenotaenia pusilla* were refractory to infection with the *Brachylaemus*. S. Willmott

- 2602**—TIMON-DAVID, J., 1960. [Laboratoire de Biologie Animale A.P.C.N., Faculté des Sciences de Marseille, France.] "Recherches expérimentales sur le cycle de *Dicrocoelioides petiolatum* (A. Railliet 1900) (Trematoda: Dicrocoeliidae)." *Annales de Parasitologie Humaine et Comparée*, **35** (3), 251-267.

[This is a more detailed account, illustrated by line drawings and photomicrographs, of the work described by Timon-David in *C. R. Acad. Sci. Paris*, 1958, **247**, 2497-2499 & 1959, **248**, 2909-2911. For abstracts see Helm. Abs., **29**, Nos. 2142 & 2143.]

- 2603**—ULMER, M. J., 1960. "*Physa sayii*, a new intermediate host for the turtle lung fluke, *Heronimus chelydrae* (Trematoda: Heronimidae)." *Journal of Parasitology*, **46** (6), 813-814.

Ulmer exposed 36 *Physa gyrina* and 14 *P. sayii* to large numbers of *Heronimus chelydrae* miracidia. Five of the 13 *P. gyrina* and two of the six *P. sayii* which survived the experiment became infected. The sporocyst of *H. chelydrae*, showing typical pulsatile lateral branches, from *P. sayii* is figured. J. W. Smith

- 2604**—UTKINA, M. A., 1960. [Chelyabinski meditsinski institut, U.S.S.R.] [The first intermediate host of *Diphyllbothrium latum* in southern Ural.] *Zoologicheskii Zhurnal*, **39** (9), 1426-1428. [In Russian: English summary p. 1428.]

Utkina has confirmed experimentally that *Arctodiptomus ulomskyi*—a species plentiful in all the four lakes examined—is a first intermediary of *Diphyllbothrium latum* in southern Ural. All 85 females and 25 of 30 males became infected; proceroids were found seven to eight days after infection. Infection was also successful in five of 20 *Hemidiaptomus ignatovi*, small numbers of which were present in one of the lakes. G. I. Pozniak

- 2605**—VELASQUEZ, C. C., 1961. "Further studies on *Transversotrema laruei* Velasquez with observations on the life cycle (Digenea: Transversotrematidae)." *Journal of Parasitology*, **47** (1), 65-70. Velasquez has studied the life-cycle of *Transversotrema laruei* which she described in 1958 [for abstract see Helm. Abs., **27**, No. 247p]. 96 of 701 *Thiaria riquetti* were infected with the rediae and cercariae. The progenetic metacercariae of the fluke were found naturally in *Lates calcarifer* and *Molliniesia latipinna*; *M. latipinna* has been experimentally infected. The redia, cercaria and metacercaria are fully described and figured. The author briefly compares *T. laruei* with *Cercaria koliensis*, *C. patialensis* and *T. haasi*. On the basis of the present study Velasquez emends the diagnosis of the superfamily Transversotrematoidea. J. W. Smith

- 2606**—VILLELLA, J. B., 1960. "*Deroceras laeve*, a new first intermediate host of *Panopistus pricei* Sinitsin, 1931 (Trematoda: Brachylaimidae)." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 15.

- 2607**—VILLELLA, J. B., 1961. [Phoenix Memorial Laboratory, University of Michigan, Ann Arbor, Michigan, U.S.A.] "*Vallonia pulchella*, an experimental snail host of *Lyperosomum monenteron* (Price and McIntosh, 1935) (Trematoda: Dicrocoeliidae)." *Journal of Parasitology*, **47** (1), 22. Villella found 12 of 3,349 *Ventridens ligerus*, one of 362 *Zonitoides nitidus* and one of 363 *Succinea ovalis* naturally infected with the sporocysts of a dicrocoeliid. *Vallonia pulchella* was experimentally infected with *Lyperosomum monenteron* eggs teased from adult flukes taken from the gall-bladder of *Migratorius turdus*; *Ventridens ligerus*, *Z. nitidus* and several other species of snails could not be successfully infected, which suggests that the dicrocoeliid found in natural infections was not *L. monenteron*. Villella has not yet found natural infections of *L. monenteron* in either *Vallonia pulchella* or *V. costata*. J. W. Smith



- 2608**—YOKOGAWA, M., SUGURO, T., YOSHIMURA, H. & TAUJI, M., 1960. "Studies on the experimental infection of dogs with three metacercariae of *Paragonimus westermani* (Kerbert, 1878) Braun, 1899." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 35.  
The authors exposed each of ten puppies to three metacercariae of *Paragonimus westermani*. From their results they conclude that cross fertilization is necessary for sexual maturation and that it is also related to cyst formation.  
S. Willmott

### Bionomics

- 2609**—BRADBURY, S., 1957. [Cytological Laboratory, Department of Zoology, University Museum, Oxford, U.K.] "A histochemical study of the connective tissue-fibres in the leech, *Glossiphonia complanata*." *Quarterly Journal of Microscopical Science*, **98** (1), 29–45.

- 2610**—BRADLEY, C., 1961. [Institute of Parasitology, McGill University, Macdonald College, P.Q., Canada.] "The effect of electrical stimulation at low temperatures on the larvae of *Phocanema decipiens*." *Canadian Journal of Zoology*, **39** (1), 35–42.

Bradley studied the effect of electrical stimulation of nerve muscle preparations from the infective larvae of *Phocanema decipiens*. The preparations were maintained in a bath of Baldwin's medium, the temperature of which could be altered. Direct current stimuli of 10 ma and 10 v were applied using silver-silver chloride electrodes, one electrode touching the preparation, the other resting in the medium as far away from the worm as possible. Bradley refers to cathodal stimulation as occurring when the cathode was applied to the preparation and gives her reasons (cp. Bülbring, 1955 in *J. Physiol.*, **128**, 200–221). She found that at temperatures between 0°C. and 20°C. the muscles contracted in response to anodal stimulation. The muscles relaxed on cathodal stimulation at 20°C. but at lower temperatures this response was sometimes inhibited. In some cases the worm gave no response to cathodal stimulation when the temperature was first lowered, but if the temperature dropped further the muscles contracted when stimulated by the cathode. When preparations were made from worms which had been stored at –10°C. for one to four hours, there was no response to an anodal stimulus and usually a contraction in response to a cathodal stimulus. Bradley discusses these results in relation to rhythmical activity she observed in normal worm preparations, and concludes that the relaxation phenomena are not an integral part of the spontaneous rhythm. She could not relate her experimental results at low temperatures to morphological changes in the neuro-muscular system of the worms.  
H. D. Crofton

- 2611**—BRUSKIN, B. R., 1959. [Kemerovsk igosudarstvenni meditsinski institut, U.S.S.R.] [A histochemical investigation of glycogen in *Opisthorchis felinus*.] *Dokladi Akademii Nauk SSSR*, **127** (6), 1315–1316. [In Russian.]

Contrary to Golubeva [for abstract see *Helm. Abs.*, **14**, No. 426a], glycogen in *Opisthorchis felinus* was found principally in the parenchyma between the uterine loops, along the intestine and excretory canal and around the sex organs. Some was also present in the vitellaria, suckers, mature spermatocytes and around the male pore, but only very little in the "cuticulo-muscular sac" and none in the egg cells and ovary.  
G. I. Pozniak

- 2612**—CAMPBELL, W. C., 1960. [Merck Institute for Therapeutic Research, Rahway, New Jersey, U.S.A.] "Nature and possible significance of the pigment in fascioloidiasis." *Journal of Parasitology*, **46** (6), 769–775.

Campbell showed that the pigment which remained as a residue after peptic digestion of *Fascioloides magna* was an iron-porphyrin. He considered that the pigmentation associated with fascioloidiasis is due to the deposition of this haem compound in the tissues of the host.  
W. P. Rogers

- 2613**—CARBONELL, L. M. & APITZ, C., R., 1960. [Sección Medicina, Instituto Venezolano de Investigaciones Científicas, Apartado 1827, Caracas, Venezuela.] "Sulphydryl and disulfide groups in the cuticle of *Ascaris lumbricoides* var. *suis*." *Experimental Parasitology*, New York, **10** (3), 263–267.

Carbonell & Aritz have studied the cuticle of *Ascaris lumbricoides* of the pig by histochemical techniques, phase contrast and birefringence microscopy. Their studies disclose the presence

of four regions: (i) a peripheral squamous region ( $1.6\mu$  in thickness), (ii) a sub-squamous region ( $10.6\mu$  in thickness), (iii) an anhistous region ( $33\mu$  in thickness), and (iv) a fibrous region composed of three layers [thickness not given]. Sulph-hydryl groups occur throughout the three layers of the fibrous region. Sulph-hydryl groups in the anhistous region appear in the form of fibrils in the peripheral tract only; the rest of this region appears negative which, it is suggested, may be due to the combining of sulph-hydryl groups in some way so preventing a positive reaction with the reagent used. In the sub-squamous region sulph-hydryl groups appear to be transformed into disulphide groups. Disulphide groups occur throughout the squamous region the outermost tract being the most strongly positive. Eight photomicrographs show sections of cuticle after treatment by various histochemical techniques.

J. W. Smith

**2614**—CIORDIA, H. & BIZZELL, W. E., 1960. "The effect of temperature on embryonic and larval development of various species of cattle nematodes." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 40.

Eggs of *Cooperia oncophora*, *C. punctata*, *Ostertagia ostertagi*, *Trichostrongylus axei* and *T. colubriformis* kept at various constant temperatures and relative humidity of about 95% developed at the same rate and in a similar manner. The time taken to reach the infective stage was 7 to 9 days at  $25^{\circ}\text{C}$ . and  $32^{\circ}\text{C}$ ., 9 days at  $20^{\circ}\text{C}$ ., 19 days at  $15^{\circ}\text{C}$ . and about 28 days at  $10^{\circ}\text{C}$ . Development did not proceed beyond the first larval stage at  $5^{\circ}\text{C}$ . More larvae were recovered from cultures at  $25^{\circ}\text{C}$ . than at other temperatures and the introduction of sphagnum moss into the culture accelerated development. Work on outside plots indicated that the rate of development was influenced by the mean daily temperature.

S. Willmott

**2615**—CONNAN, R., 1961. [201, Chesterton Road, Cambridge, England.] "The effect of passage through the alimentary canal of the sheep on the development of eggs of *Nematodirus battus*." [Correspondence.] *Veterinary Record*, **73** (16), 408.

Connan, commenting on the paper under the same heading by Everett & Gibson [for abstract see No. 2625 below] points out the possible explanation for the rapid clearance of *Nematodirus* eggs through the alimentary canal in lambs drenched with a suspension of the eggs; it may be due to closure of the oesophageal groove resulting in a by-passing of the rumen. He suggests that the passage of the eggs would be considerably delayed in the rumen if they were taken up by grazing under natural conditions so that a much greater proportion would be destroyed.

W. M. Fitzsimmons

**2616**—DERY, D. W., 1961. [Florida State University, U.S.A.] "Host hibernation and its effects on *Schistosomatum douthitti* and *Schistosoma mansoni* (Trematoda: Schistosomatidae)." *Dissertation Abstracts*, **21** (8), 2409-2410.

**2617**—DIAMOND, L. S. & DOUVRES, F. W., 1960. "Cultivation of parasitic stages of the swine nematodes *Hyoststrongylus rubidus* and *Oesophagostomum quadrispinulatum* (*O. longicaudum*) free of microbial associates." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 25.

Infective larvae of *Hyoststrongylus rubidus* and *Oesophagostomum quadrispinulatum* were exsheathed by hypochlorite and transferred to a culture medium consisting principally of trypticase, yeast extract, glucose, sheep serum and extracts of rabbit embryo and pig liver. When maintained at  $38.5^{\circ}\text{C}$ . *H. rubidus* reached the fourth moult and *O. quadrispinulatum* the fourth stage within 42 days. Compared with *in vivo* development subsequent growth of *H. rubidus* was stunted and the genital primordium lagged behind somatic differentiation. Insufficient information on *in vivo* development of *O. quadrispinulatum* is available to enable comparison to be made.

S. Willmott

**2618**—DICKSON, W. M., DUNLAP, J. S. & GORDON, T., 1960. "The detection of Krebs cycle intermediates in the incubation media of *Haemonchus placei* larvae after incubation with  $\text{C}^{14}$ -labelled substrates." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 30.

Third-stage larvae of *Haemonchus placei* were incubated with  $\text{C}^{14}$ -labelled glucose or pyruvic acid- $3\text{-C}^{14}$  in a Warburg respirometer for three hours. Radio-activity was then measured in the centre-well fluid to ascertain  $\text{C}^{14}\text{O}_2$  production, in the incubation media to ascertain



substrate uptake and metabolite excretion, and in the worms. With glucose as substrate, after celite column chromatography using gradient elution with chloroform-butanol to separate the various Krebs Cycle intermediates, activity was recorded in the pyruvate and citrate fractions; with pyruvate-3-C<sup>14</sup> radio-activity was measured in these two and in the  $\alpha$ -ketoglutarate, succinate, fumarate and l-malate fractions. Radio-activity was consistently recovered from the centre-well fluid and from the larvae. S. Willmott

**2619**—DODIN, A., CAPRON, A. & BRYGOO, E. R., 1960. "Enzymes de *Schistosoma mansoni* Sambon, 1907. Mise en évidence qualitative d'une histaminooxydase et d'une succinodéshydrogénase chez la cercaire, in vivo, et le schistosome adulte in vitro." *Comptes Rendus des Séances de la Société de Biologie, Paris*, **154** (3), 575-578.

Dodin *et al.* showed, by histochemical tests, the presence of histaminase and succinic dehydrogenase in cercariae and adults of *Schistosoma mansoni*. The activity of histaminase varied with the age of the cercariae; it was most active in cercariae eight hours after they had left the host. The distribution of the enzymes in the tissues of the larvae and adults is given. W. P. Rogers

**2620**—DOUVRES, F. W., 1960. "The *in vitro* cultivation of some gastrointestinal nematodes of cattle and sheep." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 25.

Using the medium previously described [see abstract No. 2617 above] but replacing the sheep serum by cattle serum and supplementing with vitamins in some tests, Douvres has cultured sheep and cattle nematode larvae. The most advanced stages attained in vitamin-supplemented (SM) and/or non-supplemented (NSM) medium and the earliest day after incubation that this was reached were as follows: bovine *Haemonchus contortus* and *Ostertagia ostertagi*, fourth stage at the ninth day in NSM and the seventh day in SM; *Oesophagostomum radiatum*, third moult at the 14th day in NSM and "late" fourth stage at the 27th day in SM; two bovine *Cooperia* spp., fourth stage at the ninth day in NSM; ovine *H. contortus* (phenothiazine-resistant), fourth moult at the 27th day in SM; ovine *H. contortus* (not phenothiazine-resistant) fourth moult at the seventh day in SM. These results are compared with available data on *in vivo* development. S. Willmott

**2621**—DUNAGAN, T. T., 1961. [Purdue University, U.S.A.] "Studies on the physiology of Acanthocephala." *Dissertation Abstracts*, **21** (7), 2052-2053.

*Neoechinorhynchus* spp. survived longest at pH 7.0 to 8.4 under aseptic conditions in Tyrode's balanced salt solution; the addition of various carbohydrates and/or serum prolonged survival. That neither the absence of oxygen nor the addition of phlorizin affected survival indicates that the cytochrome system does not operate in this species. Thirteen free amino-acids have now been found in *Macracanthorhynchus hirudinaceus*; none were detected in any species of *Neoechinorhynchus*. The peptides of *M. hirudinaceus*, *N. emydis* and *N. pseudemydis* differ according to species and sex. J. W. Smith

**2622**—ELLENBY, C. & GILBERT, A. B., 1960. [Department of Zoology, King's College, University of Durham, Newcastle-upon-Tyne, England.] "Progress in the study of the physiology of the hatching factor of the potato root eelworm, *Heterodera rostochiensis* Wollenweber." *Nematologica. Supplement II*, pp. 106-111. [German summary p. 111.]

Assays of highly active potato-root diffusate showed stimulation of the frog heart at concentrations similar to those for pure cardiac glycosides. Ellenby & Gilbert suggest that negative responses at high concentrations of the root diffusates are caused by inhibitors with a different threshold value from that of the hatching factors. An argument is developed justifying the hypothesis that the hatching factor contains a lactone group. H. R. Wallace

**2623**—ENGELBRECHT, H., 1961. [Kleinmachnow bei Berlin, Clara-Zetkin-Str. 23, Germany.] "Wpływ środowiska na rozwój robaków pasożytniczych." *Wiadomości Parazytologiczne*, **7** (2), 109-113.

Engelbrecht outlines, with examples, the influence of the external and internal environments on parasites and the indirect effect of the external environment through the host. The idea that "healthy animals have no parasites" would have to be revised as, according to the author's observations, *Triaenophorus nodulosus* abandons starved pike. N. Jones

2624—ETGES, F. J., 1960. "Preliminary studies with snails on chemotaxis and chemotactic agents." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 31.

*Australorbis glabratus*, *Bulinus* sp., *Physa* and *Helisoma* were subjected experimentally to "various crude and fractionated materials" [unspecified] to test their action as attractants when placed at distances up to 30 ft. from the snails. The evidence at present is inconclusive.

S. Willmott

2625—EVERETT, G. & GIBSON, T. E., 1961. [Central Veterinary Laboratory, New Haw, Weybridge, Surrey, U.K.] "The effect of passage through the alimentary canal of the sheep on the development of eggs of *Nematodirus battus*." *Veterinary Record*, **73** (12), 293-295.

When lambs ingest freshly passed eggs of *Nematodirus battus* most are passed out of the alimentary tract again within 48 hours and these are undamaged and able to continue their development. The relatively few eggs passed out between 48 and 72 hours after dosing are 40% non-viable. It is thus concluded that the ingestion of freshly passed eggs during grazing has little effect in limiting the number of larvae which will eventually reach the infective stage.

W. M. Fitzsimmons

2626—FAY, C. M. & ETGES, F. J., 1960. "Preliminary studies on the ecology of *Leidynema appendiculata* (Leidy, 1850) (Nematoda: Oxyuroidea)." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 26.

Fay & Etges found that *Blatta orientalis* could not be cultured free of *Leidynema* from isolated oothecae and they suggest that the nematode ova are transferred within the egg-case of the host. Nematode populations were decreased when the cockroaches were experimentally infected with the protozoa *Nyctotherus ovalis* and *Lophomonas* spp. Crushed garlic and piperazine citrate and tartrate given in the drinking water had no effect on the *Leidynema* populations. *In vitro* no evidence was obtained that the adult nematodes took up particulate food.

S. Willmott

2627—FRIEDL, F. E., 1961. [Department of Zoology, University of Minnesota, Minneapolis, U.S.A.] "Studies on larval *Fascioloides magna*. I. Observations on the survival of rediae in vitro." *Journal of Parasitology*, **47** (1), 71-75.

Friedl has studied *in vitro* the survival of *Fascioloides magna* rediae (obtained from *Lymnaea stagnalis jugularis*) in approximately neutral solutions of various amino-acids and of various dehydrated media containing denatured proteins and protein degradation products. The best solution in which to dissolve the test substances was found to be an amphibian Ringer's solution with the bicarbonate content halved. Rediae survived the longest in 0.1% solutions of proline, hydroxyproline or serine; no apparent development took place. Penicillin and streptomycin added together to the solutions reduced bacterial contamination and did not markedly affect the survival times of rediae.

J. W. Smith

2628—FUJIMORI, Y. ET AL., 1961. [Department of Pharmacology, Faculty of Medicine, Hirosaki University, Hirosaki, Japan.] [Studies on the distribution of survival time of *Ascaris suilla* in Bunge's solution.] *Hirosaki Medical Journal*, **12** (3), 508-512. [In Japanese: English summary p.\*73.]

The frequency of the survival period of male *Ascaris lumbricoides* (from pig) in Bunge's solution showed an almost logarithmic normal distribution. The survival time of *Ascaris* kept in Bunge's solution containing vitamin C was longer than that in the same solution without vitamin C. It was shortened when the nematodes were kept in Bunge's solution containing vitamins B<sub>1</sub> or B<sub>2</sub> but there was no significant difference between the effect of vitamins B<sub>1</sub> and B<sub>2</sub>.

Y. Yamao

2629—GLIKINA, E. L., 1961. [Kafedra biologii, Kubanski meditsinski institut, U.S.S.R.] [Study of the periods of development and survival of *Ascaris* and *Trichuris* eggs in the soil of Krasnodar.] *Gigiena i Sanitariya. Moscow*, **26** (2), 107-109. [In Russian.]



- 2630**—GOLIKOVA, M. N., 1961. [Ecological and parasitological study of the biocoenosis of some lakes in the Kaliningrad region. V. General survey.] *Vestnik Leningradskogo Universiteta. Seriya Biologii*, **16** (9), 46–60. [In Russian: English summary pp. 59–60.]

The results of a general survey of the parasite fauna of two eutrophic lakes on a poultry farm in the Kaliningrad region are reported. 5,110 animals representing 82 species of birds, amphibians, fish, molluscs, insect larvae, crustaceans and leeches, were examined and 294 species of parasites, including helminths, were found. The helminth fauna is discussed, trematodes receiving special attention; species typical for the lakes are tabulated. The circulation of parasites in the lakes (involving 30 different cycles) is represented schematically. [For other parts in this series dealing with the helminth fauna of specific host groups see abstract No. 2317 above and Helm. Abs., **30**, Nos. 1634 & 1873; also *Sbornik "Ekologicheskaya Parazitologiya"*, 1960, published by the Leningrad University.] G. I. Pozniak

- 2631**—GOODCHILD, C. G., 1960. [Department of Biology, Emory University, Atlanta, Georgia, U.S.A.] "Effects of starvation and lack of bile upon growth, egg production and egg viability in established rat tapeworms, *Hymenolepis diminuta*." *Journal of Parasitology*, **46** (5), 615–623.

Goodchild used 69 rats divided into three experimental classes: normal rats, rats with biliary by-pass to the caecum and starved rats. Each rat was infected with a single cysticercoid of *Hymenolepis diminuta*. Tapeworms in bile-less hosts responded morphologically and functionally as those in starved hosts, or else showed more adverse effects. Statistical analyses showed egg output by tapeworms in bile-less and starved hosts to be equal, but less than from normal hosts. Proglottides shed from a bile-less host were filled with fat-like vacuoles and were opaque marginally; the eggs were irregular in shape and their internal morphology was abnormal. Tapeworms in bile-less hosts were more posteriorly located in the small intestine and were shorter than those in normal or starved hosts. The authors state that the feeding of eggs to *Tribolium confusum* produced significantly different recovery rates of cysticercoids from eggs of the three experimental groups. J. W. Smith

- 2632**—GUPTA, S. P., 1961. [Department of Zoology, University of Lucknow, India.] "The effects of temperature on the survival and development of the free-living stages of *Trichostrongylus retortaeformis* Zeder (Nematoda)." *Canadian Journal of Zoology*, **39** (1), 47–53.

Gupta studied the effect of temperature on the free-living stages of *Trichostrongylus retortaeformis* using agar culture methods. He gives the time required for hatching and development at temperatures from 5°C. to 35°C. and plots the rate of growth of the larva at different temperatures on agar cultures of *Escherichia coli*. Eggs hatched at 35°C. in 18 hours but the larvae died. He suggested that the optimum temperature for development to the infective stage is 25°C. at which hatching occurs in 21 to 23 hours and the infective stage is reached in 68 to 72 hours. Few infective larvae previously cultured at 20°C. died before 11 months at 5°C., before 10 months at 25°C. and before eight months at 30°C.; at lower temperatures the deaths occurred more rapidly. H. D. Crofton

- 2633**—HANUMANATHA-RAO, K., 1959. "Histochemistry of Mehlis' gland and egg-shell formation in the liver fluke *Fasciola hepatica*." *Experientia. Basle*, **15** (12), 464–465. [German summary p. 465.]

By a series of histochemical tests Hanumantha-Rao has demonstrated that Mehlis' gland in *Fasciola hepatica* elaborates and secretes a phospholipid. Neither the egg-shell at any stage nor its precursors gave phospholipid reactions. There is no indication that the Mehlis' gland secretion plays any part in the tanning system during egg-shell formation but it may be concerned with effecting the release of egg-shell precursors from the vitelline cells. Three photomicrographs illustrate the paper. S. Willmott

- 2634**—HANUMANATHA-RAO, K., 1960. [Department of Zoology, Andhra University, Waltair, India.] "The problem of Mehlis's gland in helminths with special reference to *Penetrocephalus ganapati* (Cestoda: Pseudophyllidae)." *Parasitology*, **50** (3/4), 349–350.

Hanumantha-Rao suggests that Mehlis' gland secretion in *Penetrocephalus ganapati* may be a lecithin-like phospholipid. A negative Nile-blue test indicates that glycolipids are not present, although the secretion is strongly positive to the periodic acid-Schiff technique.

The author suggests that, after enzymic degradation of the lecithin into lysolecithin, the release of egg-shell precursors from the vitelline cells may be effected, as previously suggested in his study of the secretion in *Fasciola hepatica* [see abstract No. 2633 above]. Soon after the completion of the egg-shell the lysolecithin may be reconverted into lecithin in the vitelline cells of *P. ganapati*, which would account for the positive periodic acid-Schiff reaction.

J. W. Smith

- 2635**—HARTWELL, W. V., DAHLSTROM, R. V. & NEAL, A. L., 1960. [Phoenix Field Station Section of U.S.P.H.S., VDA, Phoenix, Arizona, U.S.A.] "A crystalline hatching stimulant for the golden nematode." *Phytopathology*, **50** (8), 612-615.

The method of extraction of a crystalline preparation from lyophilized tomato root leachings is described. The preparation, which stimulated larval emergence from cysts of *Heterodera rostochiensis*, contains a hydroxyl group but no free carboxyl group. A tentative formula of  $C_{13}H_{12}O_3$  and a molecular weight of about 217 for the active material is suggested from analytical determinations.

H. R. Wallace

- 2636**—HOLZ, J., 1961. [Bandung, Djalan Pasteur 3, Indonesia.] "Quantitative Untersuchungen über den Vitamin-C-Gehalt einiger Mensch- und Haustier-pathogener Helminthen." *Wiadomości Parazytologiczne*, **7** (2), 115-120. [Polish summary p. 120.]

From a study of the vitamin C content of *Fasciola hepatica*, *Paramphistomum cervi*, *Eurytrema pancreaticum*, *Ascaris lumbricoides*, *Ascaridia galli*, *Moniezia expansa*, *Taenia saginata* and *Hymenolepis diminuta*, Holz concludes that helminths play an important role as regards the presence of this vitamin in the host.

N. Jones

- 2637**—HONMA, Y., 1960. [Department of Pharmacology, Faculty of Medicine, Hirosaki University, Hirosaki, Japan.] [Studies on the breeding of *Ascaris suilla* in Bunge's solution containing vitamin C and on the concentrations of vitamin C in roundworms.] *Hirosaki Medical Journal*, **12** (2), 373-381. [In Japanese: English summary p. \*56.]

- 2638**—HOPKINS, C. A. & HUTCHISON, W. M., 1960. [Department of Zoology, University of Glasgow, Scotland.] "Studies on *Hydatigera taeniaeformis*. III. The water content of larval and adult worms." *Experimental Parasitology. New York*, **9** (3), 257-263.

Hopkins & Hutchison measured the water content of *Hydatigera taeniaeformis* at various stages of development of the larvae in mice and of the adults in cats. The authors concluded that at certain ages the parasite has a "normal" water content and that variations from this may be used as an indication of abnormality.

W. P. Rogers

- 2639**—HWANG, J. C., 1960. "Effects of pH, various proteolytic enzymes, amino acids and other substances on the eggs and larvae of *Ascaridia galli*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 27.

Embryonated eggs of *Ascaridia galli* were incubated at 40°C. to 42°C. in a medium (physiological saline, dextrose and sodium bicarbonate) to which one of the following was added: pepsin, trypsin, sodium taurocholate, duodenal powder, ox bile, serine, proline, tryptophane, leucine or tyrosine. Active larvae were found in all but duodenal powder or tyrosine although in small numbers except with trypsin. With trypsin only pH 6.8 to 7.2 gave positive results. The pH of gut contents of freshly killed parasite-free chicks and infected chicks was studied in relation to the site of hatching and the distribution of the nematodes.

S. Willmott

- 2640**—ISHIBASHI, N., KEGASAWA, K. & KUNII, Y., 1960. [Kantô-tôsan National Agricultural Experiment Station, Kônosu, Saitama-ken, Japan.] "Studies on hatching of the root-knot nematode, *Meloidogyne incognita* var. *acrita* Chitwood. I. The relation between hatching and the original egg content of egg mass." *Japanese Journal of Applied Entomology and Zoology*, **4** (4), 249-255. [Japanese summary p. 255.]

Ishibashi *et al.* investigated the emergence of the second-stage larvae of the root-knot nematode, *Meloidogyne incognita* var. *acrita*, from the egg mass (i.e. the gelatinous egg sac and the contained eggs). It was found that the ratio of the emerged larvae to the egg content of a single egg sac decreased in accordance with the increase of the original egg content. The increase of this ratio was accompanied by a decrease of the variation coefficient. A 50% larval



emergence was obtained from egg masses containing 240 to 300 eggs after one week's incubation at 26°C. The number of larvae remaining inside the egg sac at the end of the week's incubation was greatest in an egg mass containing 300 to 400 eggs. M. Ichinohe

**2641**—JASKOSKI, B. J., 1960. "Amino acids in *Ascaris suum* eggs." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 27.

Eighteen natural amino-acids have been demonstrated in the outer egg membranes and larvae of pig *Ascaris* and nine have been identified in the inner egg membrane; this was previously thought to be lipid in nature. S. Willmott

**2642**—JONES, F. G. W., 1960. [Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, U.K.] "Some observations and reflections on host finding by plant nematodes." **Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent**, **25** (3/4), 1009–1024.

Jones reviews some of the literature on host finding by plant-parasitic nematodes and concludes that evidence exists of response to electric potentials, moisture gradients, carbon dioxide, a few acidic and reducing compounds, to unknown substances emanating from roots and possibly to substances produced by bacteria in the rhizosphere. No evidence exists of response to gradients of temperature or pH in soil. The characteristics of the soil environment are summarized and it is concluded that factors affecting host finding must be many and sometimes conflicting. Most experiments are done in static systems but soil is not static and stimulatory substances may be carried by air or water movement over greater distances than would be possible by diffusion alone. There is a need to determine the concentration gradients of attractant substances in soil and to assess the sensitivity of nematode sense organs. Plants probably produce many non-specific stimuli that attract nematodes for which they are not hosts. Jones ends with a comparison between host finding in nematodes and a soil insect, *Agriotes*, and with comments on host specificity. In the text, experiments with electric currents are outlined in which *Turbatrix aceti* and *Ditylenchus dipsaci* are shown to aggregate around the cathode while larvae of *Heterodera schachtii* aggregate around the anode. The minimum potential gradient giving the aggregation response was 20–30 m V per mm. The movements of *D. dipsaci* which lead to aggregation are described. F. G. W. Jones

**2643**—LENHOFF, H. M., SCHROEDER, R. & LEIGH, W. H., 1960. "The collagen-like nature of metacercarial cysts of a new species of *Ascocotyle*." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 36.

The walls of the metacercarial cysts of *Ascocotyle* sp. from *Cyprinodon variegatus* are 30  $\mu$  to 35  $\mu$  thick; on drying they become thin and buckled but when replaced in water swell to their original thickness. They are resistant to trypsin, ficin and papain and chemical analysis shows that an average cyst contains 0.2 mg. hydroxyproline. This amino-acid is a component of collagens and has not been reported previously in the Platyhelminthes. S. Willmott

**2644**—LEWERT, R. M. & DUSANIC, D. G., 1960. "The effect of a diamino-dibenzyl-alkane on the histochemical reaction for alkaline phosphatase in adult *Schistosoma mansoni*." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 32.

Living adult *Schistosoma mansoni* incubated in horse serum show intense alkaline phosphatase activity but when a symmetrical diamino-dibenzyl-alkane is added to the serum the alkaline phosphatase activity is faint or imperceptible. This effect is reversible. Activity of mammalian alkaline phosphatase was not affected. S. Willmott

**2645**—LINDHARDT, K., 1960. "Nogle undersøgelser over infektionsgradens indflydelse på havreålsens køn (*Heterodera major* O. Schmidt, 1930)." **Tidsskrift for Planteavl**, **64** (5), 889–896. [English summary pp. 895–896.]

The influence of the degree of infection on sex determination in the cereal root eelworm was studied. The ratio of males to females clearly increased with the degree of infection as found in pot experiments. This was also found in later field tests. The increasing sex ratio cannot be due to a retardation of the speed of development. Competition for food may possibly be an explanation for the increasing sex ratio. S. Bingeors

\*2646—MOROZOV, F. N., 1957. [The biology of *Prosthogonimus ovatus*.] *Uchenie Zapiski. Gorkovskii Gosudarstvennyi Pedagogicheskii Institut*, 19, 23–25. [In Russian.]

2647—NADAKAL, A. M., 1960. "Biochromes in certain species of larval trematodes." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 31.

The chemical nature and sources of pigments in ten species of larval trematodes [not named in this author's abstract] from *Cerithidea californica* have been studied.  $\beta$ -carotene was identified in eight species. No sporocysts and only three species of redia contained chlorophyll derivatives. A keto-carotenoid occurred in one sporocyst. Melanins have been shown to be located in the eye-spots and body tissues of three species of cercaria. Tyrosine was found in all nine species of cercaria studied. Tests for tyrosinase were inconclusive. The eye-spots in *Euhaplorchis metacercariae* in *Fundulus* have been studied during six weeks of their development. Tests for flavones, riboflavin, haemoglobin, bile pigments, lipofuscines and haemocyanins were consistently negative. S. Willmott

2648—NADAKAL, A. M., 1960. [Department of Biology, University of Southern California, Los Angeles, California, U.S.A.] "Types and sources of pigments in certain species of larval trematodes." *Journal of Parasitology*, 46 (6), 777–786.

Nadakal was able to trace the origin of pigments in coloured rediae (six types), sporocysts (three types) and in one cercaria via the food chain to the algae on which the host snails fed.  $\beta$ -carotene was the common pigment and a keto-carotenoid was found in some larvae. Only three types of rediae and none of the sporocysts contained derivatives of chlorophyll.

W. P. Rogers

2649—NICHOLAS, W. L. ET AL., 1960. "The incorporation of  $^{14}\text{C}$  from sodium acetate-2- $^{14}\text{C}$  into the amino acids of the soil-inhabiting nematode, *Caenorhabditis briggsae*." *Journal of Experimental Biology*, 37 (3), 435–443.

Nicholas *et al.* cultured *Caenorhabditis briggsae* under axenic conditions in a medium containing acetate-2- $\text{C}^{14}$ . The  $\text{C}^{14}$  was subsequently found to be present in the following amino-acids in the organism: aspartic acid, glutamic acid, alanine, proline, glycine, serine and cysteine or cystine.

W. P. Rogers

2650—NIMMO-SMITH, R. H. & KEELING, J. E. D., 1960. [Wellcome Laboratories of Tropical Medicine, Euston Road, London, England.] "Some hydrolytic enzymes of the parasitic nematode *Trichuris muris*." *Experimental Parasitology. New York*, 10 (3), 337–355.

Nimmo-Smith & Keeling have studied extracts of adult *Trichuris muris*; their results are expressed both graphically and in tabulated form. Two proteolytic enzymes appear to be present, one most active between pH 2.6 and 3.6, the other at pH 4.8; above pH 6.0 proteolysis is absent. Two other enzymes are probably involved in the depolymerization of hyaluronate, heparin and chondroitin sulphate. Two ribonucleases and one deoxyribonuclease with acid pH optima are probably present. Amongst the carbohydrates tested for was found an amylase and various  $\alpha$  and  $\beta$ -glycosidases. An esterase similar to a mammalian B-type esterase is present, but no lipase. The activity of an acid phosphomonoesterase is stimulated by manganese, cobalt and magnesium ions; an alkaline phosphodiesterase is also present. Anterior ends of the worm show higher proteolytic and esteratic activity than posterior ends. It is unlikely that any of the above enzymes are responsible for digesting host tissues; they are probably concerned with cellular metabolism within the parasite.

J. W. Smith

2651—NITZULESCO, V., SORESCO, A. & PANAITESCO, D., 1958. [Institut "Dr. I. Cantacuzino", Section d'Helminthologie, Bucharest, Rumania.] "Sur l'éclosion spontanée des oeufs de trichocéphale." *Archives Roumaines de Pathologie Expérimentale et de Microbiologie*, 17 (3/4), 449–453. [English, German & Russian summaries pp. 452–453.]

The phenomenon of spontaneous hatching of eggs of *Trichuris vulpis* and *T. trichiura* is discussed and it is suggested that this may occur as a result of microbial activity causing digestion of the egg-shell. Mortality of spontaneously hatched larvae is high and as a result there are certain regions in Rumania where *Trichuris* is unable to develop because of this phenomenon.

W. M. Fitzsimmons



**2652**—ODETOYINBO, J. A., 1961. [Iowa State University of Science & Technology, U.S.A.] "Biology of *Splendidofilaria quiscali* (von Linstow, 1904) n.comb. (Nematoda: Onchocercidae)." **Dissertation Abstracts**, **21** (9), 2836-2837.

45 of 112 *Quiscalus quiscula versicolor* from Ames, Iowa, were found infected with *Splendidofilaria quiscali* n.comb. [for *Filaria quiscali* von Linstow, 1904]. The adult worms, which are predominately female, are usually restricted to the lateral ventricles of the brain; the infection does not produce any appreciable pathological effects on the grackle. The microfilariae show a well-marked nocturnal periodicity; when normal periods of light and darkness were interchanged periodicity was reversed. Microfilariae transfused intravenously into chickens survived in the peripheral circulation for at least 31 days. Attempts to infect four species of mosquitoes, two species of mites, *Simulium* spp. and *Stomoxys calcitrans* with microfilariae were unsuccessful. [See also abstract No. 2653 below.] J. W. Smith

**2653**—ODETOYINBO, J. A. & ULMER, M. J., 1960. "Microfilarial periodicity of *Splendidofilaria quiscali* (von Linstow, 1904) n.comb. (Nematoda: Onchocercidae)." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 18-19.

The microfilarial periodicity of *Splendidofilaria quiscali* n.comb. [for *Filaria quiscali*] from *Quiscalus quiscula versicolor* is normally markedly nocturnal. Periodicity could be reversed by keeping infected birds in artificial light between 8 p.m. and 8 a.m. Continuous exposure to light for five consecutive days resulted in a disruption of the nocturnal periodicity in all but one bird but this was re-established when the birds were returned to normal conditions of light and darkness for five days. When birds were kept in continuous darkness for five days the nocturnal periodicity was unaffected. [See also abstract No. 2652 above.]

S. Willmott

**2654**—OOSTENBRINK, M., 1961. [Plant Protection Service, Agricultural University, Wageningen, Netherlands.] "Nematodes in relation to plant growth. II. The influence of the crop on the nematode population." **Netherlands Journal of Agricultural Science**, **9** (1), 55-60.

Oostenbrink gives the results of nematode population studies in three rotation field trials. Cultivation of different crops, even for only one year, caused changes in population density of some parasitic nematodes in silt and sandy soil. In one trial where three *Heterodera* spp. were present the effect of various crops on the densities of these different species was very marked and showed the control value of crop rotation. There was no build up of *H. rostochiensis* when potatoes were only grown every third year. Monoculture of cereals caused high populations of *H. avenae* and also *H. galeopsidis*, the latter probably being due to the presence of the weed hosts. Cereals and ley (white clover) were efficient hosts of *Tylenchorhynchus dubius* and *Pratylenchus crenatus*. Beet, carrot and ley were good hosts of *Meloidogyne hapla* and beet and ley were good hosts for *Paratylenchus* sp. D. J. Hooper

**2655**—OUDEN, H. DEN, 1960. [Instituut voor Plantenziektenkundig Onderzoek, Wageningen, Netherlands.] "Periodicity in spontaneous hatching of *Heterodera rostochiensis* in the soil." **Nematologica. Supplement II**, pp. 101-105. [German summary p. 105.]

The number of free larvae of *H. rostochiensis* found in soil without a host crop rose sharply during the spring months, after which there was a steady decrease in the number recovered. With a two-year-old population, the maximum spontaneous hatch was achieved six weeks later than with a one-year-old population. The cyst contents decreased up to the period when maximum numbers of free larvae were recovered, but after this they remained almost unchanged until the following March. It seems likely that most of the loss of cyst contents in soil is from spontaneous hatching, although other factors may also play a part. In a laboratory experiment on the longevity of hatched larvae in soil, it was found that there was hardly any loss during the first few weeks, but after seven weeks 50% of the larvae had died. A. M. Shepherd

**2656**—PANTELOURIS, E. M. & GRESSON, R. A. R., 1960. [Department of Zoology, Queen's University of Belfast, Northern Ireland.] "Autoradiographic studies on *Fasciola hepatica* L." **Parasitology**, **50** (1/2), 165-169.

Tracers in the form of  $\text{Fe}^{59}$  and  $\text{C}^{14}$  were injected into the lumen of the gut of *Fasciola hepatica* which were then maintained up to 60 minutes in Stephenson's saline or up to five days in the

abdominal cavity of mice. Both tracers were detected in the cuticular epithelium, the myoblasts and the cells forming the walls of the excretory tubules and, in addition, the iron was also found in the intestinal epithelium. It is tentatively concluded that "whilst speedy excretion takes place through the excretory system proper, relatively large amounts of excess organic substances of iron accumulate in the myoblasts and the cuticular epithelium, and are eliminated from the latter in the mucus".

W. M. Fitzsimmons

**2657**—PITTS, T. D., 1960. "In vitro culture of the larvae of *Ascaris lumbricoides* suum. A report on progress." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 24–25.

Newly hatched pig *Ascaris* larvae and four, six and eight-day-old larvae from the livers and lungs of mice were cultured in roller tubes in media consisting of hog serum and CEE alone or with various organic supplements. Poor survival and growth resulted with newly hatched larvae but older larvae showed length increases of 100% to 200%. The largest size was obtained with eight-day larvae from the liver in an 18-day culture. Although a few free sheaths were seen the process of exsheathing has not been observed.

S. Willmott

**2658**—ROBERTS, L. S., 1960. "Growth dynamics of *Hymenolepis diminuta* in the albino rat as affected by population density." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 11.

Growth of *Hymenolepis diminuta* in experimentally infected rats follows a skew logistic type curve with the following characteristics: there is a lag phase of one day or less followed by a phase of rapid exponential growth lasting five to six days; this is followed by a long retardation phase ending in maximal size which is attained 15 to 17 days after infection. These characteristics are shown by all the tapeworms regardless of population density and there is no measurable difference in the rate of growth in large infections until the retardation phase is reached; then the worms in large populations grow more slowly to reach a smaller maximum size.

S. Willmott

**2659**—ROGERS, W. P. & SOMMERVILLE, R. I., 1960. [University of Adelaide, South Australia.] "The physiology of the second ecdysis of parasitic nematodes." *Parasitology*, **50** (3/4), 329–348.

Rogers & Sommerville found that the action of rumen fluid as a stimulus for the exsheathing of third-stage trichostrongyle larvae was affected by the pH, Eh and temperature. Under certain circumstances freeze-dried, aerated or boiled rumen fluid stimulated exsheathment. The mechanisms for reception of the stimulus to exsheath and for storing and releasing the exsheathing fluid were located in the region between the base of the oesophagus and the excretory pore. The exsheathing fluid from one species was not necessarily as active on sheaths from other species as on its own. Dialysed exsheathing fluid was inactive but activity could be restored by adding magnesium chloride or manganese chloride.

W. P. Rogers

**2660**—RYBICKA, K., 1960. [Department of Parasitology, Polish Academy of Sciences, Warsaw, Poland.] "Glycogen distribution during the embryonic development of the cestode *Diorchis ransomi* Schultz, 1940." *Experimental Parasitology*, **New York**, **10** (3), 268–273.

Rybicka has studied the distribution of glycogen in the mature proglottides and developing eggs of *Diorchis ransomi*. In all proglottides large droplets of glycogen occur in the parenchyma. The subcuticular parenchyma and Mehlis' gland contain a non-glycogenous material which, although positive to the periodic acid-Schiff technique, is not digestible with saliva. The testes, sperm, seminal vesicles and seminal receptacle contain no glycogen; the ovary and the wall of the cirrus pouch contain a small amount. The wall of the uterus and the vitellarium are rich in glycogen, as is the vitelline cell within early embryos. During cleavage the amount of glycogen remains unchanged as a globular mass in the embryo. In the pre-oncosphere and oncosphere all glycogen deposits are found in the outer membrane; non-glycogenous material occurs in the matrix of the mature oncosphere. Cestodes may be grouped into two on the basis of the absence or presence of glycogen in the vitellarium; the work of others on the distribution of glycogen in various cestodes is discussed. The paper is illustrated by six photomicrographs.

J. W. Smith



- 2661**—SASA, M. ET AL., 1960. [Department of Parasitology, Institute for Infectious Diseases, University of Tokyo, Tokyo, Japan.] "Observation on the behavior of infective larvae of hookworms and related nematode parasites, with notes on the effect of carbon dioxide in the breath as the stimulant." *Japanese Journal of Experimental Medicine*, **30** (6), 433–447.

Sasa *et al.* have studied the effects of carbon dioxide on the behaviour of the infective larvae of *Ancylostoma caninum*, *A. duodenale*, *Necator americanus*, *Nippostrongylus brasiliensis*, *Trichostrongylus orientalis* and *Strongyloides stercoralis*. A description is given of the preparation of a gypsum-charcoal cone and associated apparatus upon which the larvae are placed for observation. When the cone contains about 42% by weight of water the larvae of most of these species, especially *A. caninum*, stand erect using the tail as a support; on stimulation with carbon dioxide they shake their heads in a pendulum-like fashion. Those infective larvae which rarely show this erect posture, e.g. *A. duodenale* and *S. stercoralis*, always move around and react sensitively to carbon dioxide whereas none of the rhabditiform larvae of any of these species nor any stage of *Rhabditis* sp. react in this way. Both expired air of human origin and chemically prepared carbon dioxide stimulate the larvae, the number of larvae reacting and the intensity of movement being related to the concentration of carbon dioxide; normal air or carbon dioxide-free expired air do not elicit this response. Although the larvae were also stimulated by various volatile chemicals and by radiant heat such reactions are not considered by the authors to be comparable with those obtained with carbon dioxide.

J. W. Smith

- 2662**—SEMBDNER, G. & SCHREIBER, K., 1960. [Biologische Zentralanstalt der Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin, Germany.] "Über die schlüpfaktive bzw. schlüpfhemmende Wirkung der Wurzel diffusate verschiedener Pflanzen auf den Kartoffelnematoden, *Heterodera rostochiensis* Woll. 2. Mitt. über *Heterodera*-Arten." *Nematologica. Supplement II*, pp. 127–140. [English summary p. 138.]

Sembdner & Schreiber investigated the stimulatory and inhibitory effects, on the hatching of *Heterodera rostochiensis*, of root diffusates from various plant species and varieties. Generally the plants investigated fell into three categories: (i) those which appeared to stimulate hatching when used alone and had no obvious inhibitory effects when used in mixtures with diffusate from the cultivated potato variety "Aquila"; (ii) those which had no obvious stimulatory effects when used alone and appeared to inhibit hatching when used in mixtures; and (iii) those which appeared neither stimulatory nor inhibitory. To (i) belong most species of *Solanum* and *Lycopersicum* tested, to (ii) most other Solanaceae tested and to (iii) most non-solanaceous plants tested. The inhibitory properties in *Nicotiana* diffusates were further investigated and the active substances are believed to be organic acids without irreversible or nematocidal effects. The inhibitory effects of some solanaceous alkaloids were tested; although toxic to hatched larvae nicotine had a temporary, but completely reversible, effect in hatching tests when used at concentrations of 100 to 500 mg. per litre. At the latter concentration, tropine and atropine had irreversible effects whereas scopolamine and cocaine had no effect. The authors draw attention to similarities in the supposed chemical composition of "eclepic acid" and that of gibberellic acid.

R. D. Winslow

- 2663**—s'JACOB, J. J., 1960. [Landbouwhogeschool, Wageningen, Netherlands.] "Der Einfluss einiger Gewächse auf die Population von *Meloidogyne hapla*." *Nematologica. Supplement II*, pp. 141–143. [English summary p. 143.]

The effects of various crops on two field populations of *Meloidogyne hapla* were assessed by means of counts of larvae in soil samples. In the first field, a light clay soil, four successive crops of peas, beet, grass with clover, potato, carrot, chicory, oats, rye or barley were grown on each plot. Greatest numbers of larvae occurred after peas, beet, grass with clover, and potatoes, while low numbers were found after the other crops. In the second field, an acid sand, highest numbers of larvae were found after two crops of potatoes, beet, peas, beans or carrots, with low numbers after *Tagetes patula* nana, conifers, *Chrysanthemum maximum* and strawberries. It is pointed out that counts of larvae recovered from soil do not give a complete picture of the effects of the preceding crop because many individuals may remain in the host roots, especially those of such plants as carrots and chicory.

M. T. Franklin

**2664**—STANDEN, O. D., 1959. [Wellcome Laboratories of Tropical Medicine, Euston Road, London, N.W.1, England.] "Inhibition of development of cercariae of *Schistosoma mansoni* following ultra-violet irradiation." [Abstract.] *Journal of Parasitology*, **45** (4, Sect. 2), 15.

**2665**—STEMERDING, S., 1960. [Plantenziektenkundige Dienst, Wageningen, Netherlands.] "The influence of different rotations on a population of pea cyst eelworm, *Heterodera göttingiana* Liebscher." *Nematologica. Supplement II*, pp. 97–100. [German summary p. 100.]

From 1950 to 1957, six different rotations, including peas every year, peas once every two years, three years, four years, five years and six years, were practised on soil infested with *Heterodera göttingiana*. Non-host crops included in the rotations were cereals and sugar-beet. Populations were estimated as viable cysts per 100 ml. soil. Stemerding concludes that reproduction of *H. göttingiana* differs widely from one pea crop to another and that pea crops on which reproduction is poor are fairly common. It is suggested that a year in which reproduction is efficient may decide the degree of infestation for several years. A good crop of peas was not obtained with any of the rotations tried. The yield of peas was never more than half that expected on uninfested soil.

A. M. Shepherd

**2666**—STUNKARD, H. W., 1959. [The American Museum of Natural History, New York, U.S.A.] "Induced gametogenesis in a monogenetic trematode, *Polystoma stellai* Vigueras, 1955." *Journal of Parasitology*, **45** (4), 389–394.

After succinctly summarizing the literature on the effects of hormones on invertebrates and vertebrates and of invertebrate tissue extracts on vertebrates, Stunkard briefly reports an incompleting experiment in which pituitary dissected from *Rana pipiens* was implanted in the dorsal lymph sac of half grown *Hyla septentrionalis*. When these were dissected a week later the gonads were much larger than those in the controls and contained spermatozoa. One which had received 28 pituitaries contained a polystome worm which agreed morphologically with *Polystoma stellai* Vigueras, 1955. Although its testes were full of spermatozoa, the ovary was functional and there were ova in the oviduct, the worm measured only 4.3 mm. × 0.95 mm., i.e. about half the size of Vigueras' specimen.

R. T. Leiper

**2667**—SUENAGA, O., 1960. [Department of Parasitology, Faculty of Medicine, Kagoshima University, Kagoshima, Japan.] [Studies on ancylostomiasis in Southern Kyushu. On the susceptibility of the infective hookworm larvae to high and low temperatures.] *Medical Journal of Kagoshima University*, **12** (1), 201–220. [In Japanese: English summary p. 201.]

**2668**—SUENAGA, O., 1960. [Department of Parasitology, Faculty of Medicine, Kagoshima University, Kagoshima, Japan.] [Studies on ancylostomiasis in Southern Kyushu. On the susceptibility of the infective larvae of hookworm to artificial gastric juice and HCl solution.] *Medical Journal of Kagoshima University*, **12** (1), 221–230. [In Japanese: English summary p. 221.]

**2669**—TAYLOR, A. E. R., BALL, G. H. & VOGEL, M., 1960. "Studies on the axenic culture of the rodent tapeworms, *Hymenolepis diminuta* and *H. nana*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 11.

Stage I and stage IV embryos of *Hymenolepis diminuta* maintained in roller culture at 30°C. in a medium containing extract of *Tenebrio* larvae, serum, medium 199 or salt solution showed some development. Cysticercoids of *H. diminuta* in 1% glucose in dilute Ringer (pH 7.0) remained alive and infective for seven days at 25°C. or six days at 30°C.; those of *H. nana* similarly remained alive and infective for five days at 25°C. and three days at 30°C. Cysticercoids of both species induced to excyst remained alive, in a complicated medium at 38.5°C., for four days (*H. diminuta*) and nine days (*H. nana*). The infectivity of *H. nana* to mice was lost after the first three days.

S. Willmott

**2670**—TURNER, J. H. & WILSON, G. I., 1961. [Animal Disease and Parasite Research Division, A.R.S., U.S.D.A., Beltsville, Maryland, U.S.A.] "Experimental strongyloidiasis in sheep and goats. V. The effect of certain environmental conditions and chemicals on the infective larvae of *Strongyloides papillosus*." *Journal of Parasitology*, **47** (1), 30.

Turner & Wilson record, among others, the following observations on the effect of certain environmental conditions on the third-stage larvae of *Strongyloides papillosus*: (i) no larvae



regained motility after drying for five minutes or longer; 78% survived drying for three minutes; (ii) no larvae regained motility after exposure to  $-5^{\circ}\text{C}$ . for either 24 or 48 hours; 47% survived exposure to  $3^{\circ}\text{C}$ . for 48 hours; (iii) only 3% of larvae survived exposure to sunlight (minus its heating effect) for 60 or 120 minutes; 74% survived a 30-minute exposure and all survived a 15-minute exposure; (iv) no larvae survived immersion in 95% alcohol, 70% alcohol, kerosene or aqueous solutions of 1% lysol, 1% thymol and 10% copper sulphate for 4, 6, 60, 5, 20 and 30 minutes respectively; immediate inactivation occurred in 1% aqueous iodine solution.

J. W. Smith

**2671**—UVNÄS, B., DIAMANT, B., HÖGBERG, B. & THON, I. L., 1960. "Mechanism of mast-cell disruption induced by a principle extracted from *Ascaris suis*." **American Journal of Physiology**, **199** (3), 575–578.

Uvnäs *et al.* give a method for the partial purification of a factor in *Ascaris lumbricoides* (pig strain) which disrupts mast cells. The effect of pH, ionic concentration, temperature and enzyme inhibitors on the activity of the factor suggests that the disruption of the mast cells was brought about by the activation of phospholipase *a* or a similar enzyme.

W. P. Rogers

**2672**—VEGORA, H. H., 1960. "The effect of forage height on the development of cattle nematode larvae." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 39–40.

When rainfall was excessive and temperatures were average equal numbers of cattle nematode larvae were recovered per square foot from tall and short forage and calves grazed on either type of plot acquired similar numbers of worms. When rainfall was slightly below normal and temperatures were cooler two-thirds more larvae were recovered per square foot from tall forage plots than from short forage plots and twice as many worms were recovered from calves grazing tall forage plots. Animals on taller forage yielded more *Haemonchus* spp. and *Trichostrongylus axei* in both tests and more *Ostertagia ostertagi* and *Cooperia* spp. in the second test. Heavier infections of *Nematodirus helvetianus* were acquired on short forage. The development of *Oesophagostomum radiatum* was greatly enhanced by forage height.

S. Willmott

**2673**—VERNBERG, W. B. & HUNTER, W. S., 1961. [Duke University, Durham, North Carolina, U.S.A.] "Studies on oxygen consumption in digenetic trematodes. V. The influence of temperature on three species of adult trematodes." **Experimental Parasitology**, **New York**, **11** (1), 34–38.

Vernberg & Hunter found that the oxygen uptake of *Saccacoeilum beauforti* (from fish), *Pleurogonius malaclemys* (from turtles) and *Gynaecotyla adunca* (from birds) rose in similar ways as the temperature was raised from  $6^{\circ}\text{C}$ . to  $24^{\circ}\text{C}$ . Thereafter, however, as the temperature was raised to  $36^{\circ}\text{C}$ ., the oxygen uptake of the parasites from birds rose more rapidly than that of the parasites from cold-blooded animals. The  $Q_{10}$  values calculated over the different ranges of temperatures are given.

W. P. Rogers

**2674**—VON BRAND, T., MERCADO, T. I., NYLEN, M. U. & SCOTT, D. B., 1960. [U.S. Department of Health, Education and Welfare, PHS, National Institute of Allergy and Infectious Diseases, Bethesda, Maryland, U.S.A.] "Observations on function, composition, and structure of cestode calcareous corpuscles." **Experimental Parasitology**, **New York**, **9** (3), 205–214.

Von Brand *et al.* found that the calcareous corpuscles in *Taenia taeniaeformis* (3.1% of the fresh weight) and *Cysticercus fasciolaris* (6.9%) yielded on analysis, calcium, magnesium, phosphorus and carbon dioxide. Only small amounts of nitrogen were present (0.3% in corpuscles of *T. taeniaeformis*) and it is possible that 15% of the weight of the corpuscles was due to a rather easily volatilized inorganic compound. Crystalline material could not be detected by X-ray diffraction or by electron microscopy. The lamellae in the corpuscles seem to be made up of paired membranous rings. Histochemical tests, in addition to revealing the inorganic material, showed that the corpuscles contained polysaccharide, a muco-polysaccharide and proteins. Metabolic experiments indicated that the corpuscles serve to buffer acids entering from the medium and also, possibly, to protect the parasites against acids produced within their own tissues.

W. P. Rogers

- 2675—YASURAOKA, K., HOSAKA, Y. & OGAWA, K., 1960. [Department of Parasitology, National Institute of Health, Tokyo, Japan.] "Survival of *Ancylostoma duodenale* in vitro." **Japanese Journal of Medical Science and Biology**, 13 (4/6), 207-212.

Yasuraoka *et al.* found that adult *Ancylostoma duodenale*, obtained from experimentally infected dogs, survived *in vitro* in human serum for over four months whereas survival of worms cultured in horse serum did not exceed 60 days; female worms survived longer than male in either serum. Worms cultured in human serum increased in body-length, copulated and laid eggs; these eggs developed into filariform larvae when cultured in chick embryo extract under aseptic conditions. J. W. Smith

### Pathogenesis

- 2676—FITZGERALD, P. R., 1960. "The pathology occurring in lambs as a result of inoculation with embryonated eggs of *Ascaris lumbricoides* var. *suum*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 30.

Large numbers of embryonated pig *Ascaris* ova were inoculated into lambs. Dyspnoea and reduced food consumption were observed between the fourth and eighth days; on the eighth day, when third-stage larvae were most abundant in the lungs, one lamb died and another showed a maximum temperature of 106.9°F. In one lamb the eosinophil count reached 23% with a concurrent decline of neutrophils to 15%. Gross pathological changes occurred in the liver and lungs but there was no evidence of gross pathology 16 days or more after inoculation. The microscopic findings are described. No adult worms were recovered. S. Willmott

- 2677—GUPTA, I. M. & RANDHAWA, H. S., 1960. [Vallabhbai Patel Institute, University of Delhi, Delhi-8, India.] "Pathological changes in the liver of wild rats due to *Capillaria hepatica* with a note on its probable human occurrence in India." **Indian Journal of Medical Research**, 48 (5), 565-570.

The pathological changes in the liver of 15 of 30 rats infected with *Capillaria hepatica* in the Nai Basta area of Delhi are described and illustrated by three plates of photomicrographs. The histological changes differed markedly from those caused in the liver of monkeys and bandicoots but closely resembled those described from man and squirrels. The authors consider it likely that some of the resistant cases of pulmonary eosinophilia described in young children in Delhi may be instances of *C. hepatica* infection and that a biopsy of the liver in those with a symptom complex of hepatomegaly, splenomegaly and hyperglobulinaemia, particularly when associated with eosinophilia in the blood, may be due to this infection. R. T. Leiper

- 2678—NAEYE, R. L., 1961. [Department of Pathology, University of Vermont, College of Medicine, Burlington, Vermont, U.S.A.] "Advanced pulmonary vascular changes in schistosomal cor pulmonale." **American Journal of Tropical Medicine and Hygiene**, 10 (2), 191-199.

Autopsy of five patients infected with *Schistosoma mansoni* revealed the presence of old, calcified, partially disintegrated schistosome eggs in the lungs of each case; chronic cor pulmonale was present in three cases. Two types of angiomatoid lesions were present in the lungs. In the type associated only with cor pulmonale the lumen of the swollen pulmonary artery was replaced by connective tissue through which passed many minute vascular channels having a plexiform pattern; the development of this type of lesion was apparently unrelated to the direct deposition or movement of schistosome eggs. The other type of lesion was found outside the pulmonary artery bed and was related to the presence of eggs and the granulomatous reaction which surrounded them. Reconstructions of the angiomatoid lesions (which were built up from serial sections) and seven photomicrographs of different lesions are given. J. W. Smith

- 2679—SYMONS, L. E. A., 1961. [Division of Animal Health, C.S.I.R.O., McMaster Laboratory, Glebe, N.S.W., Australia.] "Pathology of infestation of the rat with *Nippostrongylus muris* (Yokogawa). VI. Absorption *in vivo* from the distal ileum." **Australian Journal of Biological Sciences**, 14 (1), 165-171.

Symons has measured *in vivo* the net fluxes of water, sodium and chloride in, and the absorption of glucose by, the distal ileum of rats infected with *Nippostrongylus muris*; this is the sixth



of a series of papers on the pathology of *N. muris* in the rat. The infection did not cause any major anatomical change in the worm-free ileum since the dry-weight of the distal ileum per unit length was the same in normal and infected rats. There was a net efflux of water, sodium and chloride from the lumen of the ileum of both normal and infected rats; the net efflux of sodium was significantly greater in infected rats. The ileum of infected rats absorbed glucose faster than did that of normal rats. The apparently unaffected absorption of carbohydrate seen here, together with the depression of protein digestion (reported in Part V of this series) leads Symons to conclude that the more important aspect of nipprostrongylosis in the rat is the failure of digestion rather than the malabsorption of its products. [For abstract of Part I of this series see Helm. Abs., 26, No. 186a, for abstracts of Parts II, III, IV and V see Helm. Abs., 30, Nos. 1194, 1195, 1196 & 2014.]

J. W. Smith

### Immunity

**2680**—ALLAIN, D. S. & KAGAN, I. G., 1961. [Department of Health, Education and Welfare, United States Public Health Service, Communicable Disease Center, Atlanta, Georgia, U.S.A.] "The use of formalinized red cells in the serology of hydatid disease." *Journal of Parasitology*, 47 (1), 61–64.

Allain & Kagan have prepared formalinized sheep erythrocytes by a modification of Csizmas' method [see *Proc. Soc. exp. Biol.*, **N.Y.**, 103, 157–160] and have sensitized them with tannic acid and coated them with *Echinococcus* antigen. Such sensitized cells were satisfactory for use in haemagglutination tests for two weeks when stored at 5°C., for six months when stored at –70°C. or for seven months when freeze-dried and stored at –20°C.

J. W. Smith

**2681**—ANDERSON, R. I. & NAIMARK, D. H., 1960. [Department of Medical Zoology, Walter Reed Army Institute of Research, Washington 12, D.C., U.S.A.] "Serologic diagnosis of *Schistosoma mansoni* infections. II. Sensitivity of intradermal and serologic tests on individuals with an unequivocal diagnosis of schistosomiasis." *American Journal of Tropical Medicine and Hygiene*, 9 (6), 600–603.

The relative sensitivity of five serological and four intradermal tests for the diagnosis of *Schistosoma mansoni* was studied on 355 infected patients. The sensitivity of all the intradermal tests was considerably less than that of the serological procedures. Cercarial antigen gave the highest (75%) sensitivity and complement fixation test was 97% with adult antigen and 96% with cercarial antigen. Cercarial slide flocculation and cercarial agglutination both gave 98% although 21% of the agglutination tests gave weak reactions. Circum-oval precipitin showed a sensitivity of 88%. All the infected persons on whom all the tests were made could have been detected serologically. Although more difficult to perform the serological tests gave a higher sensitivity than the intradermal tests.

R. T. Leiper

**2682**—BÉNEX, J., RAGGAL, M. H. & DESCHIENS, R., 1960. "Aspects électrophorétiques des protéines du sérum sanguin dans les bilharzioses humaines." *Bulletin de la Société de Pathologie Exotique*, 53 (5), 793–798.

**2683**—BEZUBIK, B., 1960. "Effect of cortisone on the susceptibility of hamsters and guinea pigs to the sheep and rabbit strains of *Strongyloides papillosus*." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 30–31.

Bezubik demonstrated that daily intramuscular injections of 0.5 mg. and 1.0 mg. of hydrocortisone sodium succinate to hamsters and guinea-pigs did not render them susceptible to infection with larvae of *Strongyloides papillosus*.

S. Willmott

**2684**—BIGUET, J., ROSE, F. & HAVEZ, R., 1960. "Les possibilités d'application de l'immuno-électrophorèse à l'étude des fractions antigéniques des helminthes." *Comptes Rendus des Séances de l'Académie des Sciences. Paris*, 251 (7), 982–984.

Biguet *et al.* used immunoelectrophoresis to examine antigens in the body fluids of *Ascaris lumbricoides* from the pig and *Parascaris equorum*. Some similarities in the antigenic properties of the two parasites were demonstrated.

W. P. Rogers

2685—COSTELLO, L. C., 1960. "The effects of serotonin in experimentally-induced ascariasis." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 8-9.

Six rabbits were infected with 10,000 to 15,000 embryonated eggs of pig *Ascaris*. Ten days later they were injected intravenously with 1 mg. serotonin per kg. body-weight. Three died instantaneously and three recovered after showing symptoms of mild anaphylaxis. Controls injected with creatinine showed no reaction. Of seven similarly infected and injected with 2 mg. of reserpine per kg. three died and the remaining four showed reactions; the reaction was less pronounced than with serotonin but more prolonged. S. Willmott

2686—DOUVRES, F. W., 1960. "Influence of intestinal extracts and sera from cattle infected with *Oesophagostomum radiatum* on the in vitro cultivation of this nematode: preliminary report." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 25-26.

Douvres, using the vitamin-supplemented medium (SM) previously described [see abstracts Nos. 2617 & 2620 above], has tested the effect of sera and intestinal extracts from helminth-free calves, from one harbouring a patent *Oesophagostomum radiatum* infection and from one which had been rendered resistant to it, on the development of *O. radiatum* larvae. The reactions observed, which are described, were in part analogous to those observed by Sarles on *Nippostrongylus muris* in immune rat serum [for abstract see Helm. Abs., **7**, No. 110a]. S. Willmott

2687—DUNNETT, J. M., 1960. [Scottish Plant Breeding Station, Pentlandsfield, Roslin, Midlothian, Scotland.] "Potato breeders' strains of root eelworm (*Heterodera rostochiensis* Woll.)." *Nematologica. Supplement II*, pp. 84-94. [German summary p. 93.]

A method for standardizing the resistance of different potato varieties to different strains of *Heterodera rostochiensis* is described. Dunnett studied the resistance to eelworm of *Solanum vernei*, *S. sanctae-rosae* and *S. multidissectum*. He concluded that a type of resistance to eelworm might be advantageous to a species of potato exposed to eelworm attack and that pathogenic adaptation in the eelworm would tend to negate this advantage eventually. A classification of eelworm strains based on aggressiveness to resistant potato varieties is given. By using strains of minimum variability the kinds of resistance to *H. rostochiensis* in the many potato species can be distinguished. With this knowledge immunity or resistance can be incorporated into new potato varieties and by appropriate rotation at suitable intervals the eelworm can be controlled. H. R. Wallace

2688—EWERT, A. & OLSON, L. J., 1960. [Department of Microbiology, University of Texas Medical Branch, Galveston, Texas, U.S.A.] "Immunological tolerance studies with mice and *Trichinella*." *Journal of Parasitology*, **46** (6), 849-854.

An attempt was made to induce actively acquired immune tolerance in mice with *Trichinella spiralis*. Two types of antigenic material were used, one being the excretions and secretions of larvae and the other the disrupted bodies of larvae. New-born mice were injected intra-cardially with 0.05 ml. of antigen and a similar number of mice serving as controls were injected intra-cardially with beef serum ultra filtrate. All mice were marked and returned to the nursing mothers until weaned. The criterion for induced immune tolerance in the studies was a statistically significant increase in the worm burden of mice injected at birth intra-cardially with *Trichinella* antigen as compared with control mice injected intra-cardially with beef serum ultra filtrate. The challenge of a dose of 200 *Trichinella* larvae was given at six weeks of age. No acquired immune tolerance was demonstrated in these experiments. E. J. L. Soulsby

2689—HSÜ, S. Y. LI & HSÜ, H. F., 1961. [Department of Hygiene and Preventive Medicine, State University of Iowa, Iowa City, Iowa, U.S.A.] "New approach to immunization against *Schistosoma japonicum*." *Science*, **133** (3455), 766.

Hsü & Hsü inoculated 11 *Macaca mulatta* with cercariae of the non-human Formosan strain of *Schistosoma japonicum* and 41 to 283 days later challenged this infection with the human Japanese strain of *S. japonicum*. Whereas the number of eggs per gm. of faeces (examined during the patent period) of four non-immunized monkeys infected with the Japanese strain varied from 14,790 to 88,400 those of the 11 immunized monkeys varied from 0 to 1,634.



A proper adjustment of the timing, dosage and number of inoculations with the immunizing non-human strain might induce a complete resistance to challenging infections with the human strain.

J. W. Smith

**2690**—HUNTER, III, G. W. & WEINMANN, C. J., 1960. "Studies on schistosomiasis. XVI. Non-reciprocal acquired resistance between *Schistosoma mansoni* and *Schistosomatium douthitti*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 34.

Albino mice, "immunized" by exposures to cercariae of *Schistosoma mansoni* or *Schistosomatium douthitti*, were subsequently challenged with the homologous or heterologous species. Initial infection with *S. douthitti* gave no protection against *Schistosoma mansoni* but exposure to *S. mansoni* caused a marked reduction in the numbers of *Schistosomatium douthitti* recovered after the challenging infection.

S. Willmott

**2691**—JARRETT, W. F. H. ET AL., 1961. [University of Glasgow, Veterinary School, Glasgow, Scotland.] "Studies on immunity to *Haemonchus contortus* infection—double vaccination of sheep with irradiated larvae." *American Journal of Veterinary Research*, **22** (87), 186–188.

Following their earlier work on the vaccination of sheep with single doses of irradiated *Haemonchus* larvae [for abstract see Helm. Abs., **29**, No. 167], Jarrett *et al.* have tested sheep with double doses. A vaccine was prepared by exposing infective larvae of *H. contortus* to 40,000 r. of X-irradiation. When two doses of vaccine (each containing 10,000 larvae, given 35 days apart) were administered orally in controlled experiments involving 22 lambs, a degree of immunity sufficient to withstand a challenging infection of 50,000 normal infective larvae (given 29 days after the second dose of vaccine) was produced.

J. W. Smith

**2692**—KAGAN, I. G., NORMAN, L., ALLAIN, D. S. & GOODCHILD, C. G., 1960. "Studies on echinococcosis: nonspecific serologic reactions of hydatid-fluid antigen with serum of patients ill with diseases other than echinococcosis." *Journal of Immunology*, **84** (6), 635–640.

The authors tested 129 sera from patients (who were not infected with hydatid but had various other diseases) with *Echinococcus granulosus* antigen of porcine origin. Using haemagglutination and flocculation techniques, two sera were positive for both at a titre greater than 1 : 200 and are regarded as true false positives. However, nine were positive by haemagglutination and 11 by flocculation and some reactivity was shown by 36, including about one-half the patients suffering from cirrhosis. There was no correlation between the albumin : globulin ratios and positive or negative reactions. Analysis of antigens of porcine *E. granulosus* and cotton-rat *E. multilocularis* origin showed that both have common antigens with host liver. The authors believe that the reactivity of sera from patients with liver diseases is due to auto-antibodies which cross-react with host protein in the hydatid antigen.

G. A. Webster

**2693**—KAGAN, I. G. & PELLEGRINO, J., 1960. "Studies on the standardization of the intradermal test for bilharziasis." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 34.

[A fuller account of this paper is published in *Amer. J. trop. Med.*, 1961, **10**, 200–207. For abstract see No. 2106 above.]

**2694**—KENT, H. N., 1960. [Department of Pathobiology, The John Hopkins University School of Hygiene & Public Health, Baltimore, Md., U.S.A.] "Isolation of specific antigens from *Ascaris lumbricoides* (var. *suum*)."  
*Experimental Parasitology*. New York, **10** (3), 313–323.

Kent obtained "the water extract" of fresh adult females of *Ascaris lumbricoides*. The proteins present in this water extract were separated by paper electrophoresis and agar gel electrophoresis into five major components and these were then isolated by column chromatography using an ion exchange cellulose. Subsequently the isolated fractions were hydrolysed and examined for their amino-acid and sugar content by paper chromatography. In addition the water extracts were tested for their antigenicity against sera obtained from rabbits which had been immunized against *A. lumbricoides*. In the serological tests at least four active antigens were demonstrated and these were precipitated by the corresponding antibody. In other tests the isolated protein fractions and sera obtained from experimentally immunized animals showed that these protein fractions were antigenic and, in most cases, produced a single precipitin band in agar diffusion precipitating tests, which indicated a single antigen. Sera

from sixteen cases of suspected visceral larva migrans were examined for precipitating antibodies but only two of these gave positive results in agar diffusion precipitin tests. No cross reactions with these antigens were found with other helminth infections such as echinococcosis, trichinelliasis or schistosomiasis. The extracts were also demonstrated to be efficient in producing skin reactions in individuals infected with *A. lumbricoides*. The chemical analysis of the antigens indicated that most of the water-soluble proteins of *A. lumbricoides* were glycoprotein complexes with considerable antigenicity.

E. J. L. Soulsby

**2695**—KENT, H. N., 1960. "Isolation of specific antigens from *Ascaris lumbricoides*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 23.

[For abstract of full account of this work see No. 2694 above.]

**2696**—KÓŇA, E., 1957. [Ústav patologickej fyziológie, Veterinárská fakulta, Košice, Czechoslovakia.] "Elektroforéza krvného séra oviec, chorých na fasciolózu." *Sborník Československé Akademie Zemědělských Véd. Veterinární Medicina*, **30** (2), 159–164. [English, German & Russian summaries pp. 163–164.]

Electrophoresis of the blood serum of 37 sheep with severe fascioliasis showed a clear increase in  $\gamma$ -globulins, a moderate increase in  $\alpha$ -globulins and a decrease in albumins. N. Jones

**2697**—KUIPER, K., 1960. [Plantenziektenkundige Dienst, Wageningen, Netherlands.] "Resistance of white clover varieties to the clover cyst-eelworm, *Heterodera trifolii* Goffart." *Nematologica. Supplement II*, pp. 95–96. [German summary p. 96.]

In a pot experiment, 100 clones derived from 19 commercial varieties of white clover were tested for resistance to *Heterodera trifolii* from Dutch meadow soil. All clones successfully tested developed at least one cyst, but of these eight were considered virtually resistant.

C. C. Doncaster

**2698**—LEFLORE, W. B., 1960. "The *in vitro* action of normal and immune vertebrate sera on cercariae naturally infecting *Cerithidea californica*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 31–32.

The effect of fresh and stored normal sera of *Bufo boreas*, chicken, pigeon, cat, rabbit and man was tested on cercariae of *Parorchis avitus*, heterophyids, schistosomes, strigeids and xiphidiocercariae from *Cerithidea californica*. All except cat serum exhibited some cercaricidal effect against one or more types within one hour. The reactions are described. In most cases heating serum to 56°C. rendered it ineffective. The effect of *Schistosoma mansoni* immune human serum was tested on the schistosomes from *C. californica*; there was a weak immune reaction. Antisera from chickens (produced by injecting echinostome cercarial antigen) caused precipitates to form around such cercariae and weak reactions against *P. avitus* and *Cloacitrema michiganensis* cercariae.

S. Willmott

**2699**—LEVINE, D. M. & KAGAN, I. G., 1960. [Liberian Institute, American Foundation of Tropical Medicine, Harbel, Liberia.] "Studies on the immunology of schistosomiasis by vaccination and passive transfer." *Journal of Parasitology*, **46** (6), 787–792.

Two experiments were carried out. In one, mice were vaccinated with the metabolic products antigens of the cercariae and adults of *Schistosoma mansoni*. Approximately 400,000 cercariae were used to produce the metabolic products and 300 male and female adult *S. mansoni* were used to produce the adult metabolic product antigen. The two antigens were also combined to produce a third mixed antigen. The antigen was injected into mice using Freund's adjuvant. Five groups of 15 mice were used and following intraperitoneal injections of 0.5 ml. of the Freund's adjuvant mixture once a week for five weeks all mice were exposed to approximately 700 cercariae of *S. mansoni* one week after the last immunizing injection. Deaths in each group were recorded and the longevity of mice was used to assess the significance of the protection induced. In the passive transfer experiment three groups of mice were used, one group receiving normal hamster serum, another group receiving serum from hamsters infected with *Schistosomium douthitti* and one group receiving no serum. All mice were exposed to 100 cercariae of *S. douthitti* and again the criterion was the survival of mice in the various groups. Mice injected with the metabolic products antigen of both cercariae and adult worms



of *S. mansoni* showed a significantly longer survival period over control mice upon challenge; however, in the passive transfer of immunity experiment no statistical difference was shown in survival of injected mice over control mice.

E. J. L. Soulsby

**2700**—LEWERT, R. M. & MANDLOWITZ, S., 1960. "Studies on innate immunity to *Schistosoma mansoni*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 32.

The effect of the physiological state of the acellular elements in the host connective tissue on the relative susceptibility to *Schistosoma mansoni* is being studied. In the mouse the degree of innate immunity is correlated with the state of organization of the connective tissue. Highly significant lesser susceptibility is found in those animals with a dense, highly polymerized connective tissue with relatively small amounts of free water and water soluble components.

S. Willmott

**2701**—LOUCH, C. D., 1960. "Resistance to *Trichinella spiralis* following infection by *Nippostrongylus muris*." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 23.

Louch has shown that previous infection with *Nippostrongylus muris* protected rats to some extent against *Trichinella spiralis*. Agar-diffusion tests showed no reaction between serum of rats infected with *N. muris* and *T. spiralis* antigen.

S. Willmott

**2702**—LUCKER, J. Y. & VEGORS, H. H., 1960. "Immunization against the cattle lungworm: an experiment on the use of larvae attenuated by exposure to X-rays." [Abstract.] *Journal of Parasitology*, **46** (5, Sect. 2), 39.

Calves vaccinated with *Dictyocaulus viviparus* larvae X-irradiated with 40,000 r. were challenged 18 weeks later with 15,000 normal larvae and were found to be as susceptible as controls of the same age.

S. Willmott

**2703**—MALIK, A. ET AL., 1960. "Serum-aldolase and serum-transaminases in trichinosis." [Correspondence.] *Lancet*, Year 1960, **2** (7147), 439.

Malik *et al.* found that the activity of aldolase and transaminases in the sera of patients with trichinelliasis was increased during the period of the disease and especially during the fourth week.

W. P. Rogers

**2704**—MAYHEW, R. L., MILLER, G. C. & TORBERT, B. J., 1960. [Louisiana State University, Baton Rouge, Louisiana, U.S.A.] "Studies on bovine gastro-intestinal parasites. XXI. Immunity to *Cooperia punctata* and *Oesophagostomum radiatum*." *Journal of Parasitology*, **46** (6), 859-866.

Mayhew *et al.* investigated the course of infections of *Cooperia punctata* in worm-free calves which were inoculated with infective larvae. They based their evidence of development of immunity on worm egg counts. Some animals showed a degree of resistance to initial infection, but in others it was possible to demonstrate that a second inoculation with larvae produced no rise in egg counts or only a transient increase. In some animals a second inoculation established a low infection in which the prepatent period was two to three times the normal one and the authors use this as evidence of retardation of larval development resulting from the immunity acquired by the host. Calves which gave evidence of immunity to *C. punctata* were not resistant to infections of *Oesophagostomum radiatum*.

H. D. Crofton

**2705**—MEISENHOLDER, J. E., OLSZEWSKI, B. & THOMPSON, P. E., 1960. [Research Division, Parke, Davis & Company, Detroit 32, Michigan, U.S.A.] "Observations on therapeutic and prophylactic effects by homologous immune blood against *Schistosoma mansoni* in rhesus monkeys." *Journal of Parasitology*, **46** (5), 645-647.

Heparinized whole blood containing anti-schistosomal antibodies was obtained from a monkey in its second year of infection with *Schistosoma mansoni*. This blood was injected into two other monkeys, one infected with immature, the other with mature *S. mansoni*—approximately one-third of the blood volume of the recipients was injected. As measured by faecal egg counts this produced no effect on the rate of egg production in the experimental as compared with that in parallel control monkeys. Meisenholder *et al.* recognize that these attempts with small numbers of animals do not conclusively prove that passive immunization against *S. mansoni* is impossible.

J. W. Smith

- \*2706—NASILOVA, V. V., 1957. [The effect on sheep of the injection of various antigens during immunization against *Cystocaulus*.] **Trudi Erevanskogo Zootekhnicheskogo Veterinarnogo Instituta**, No. 21, pp. 235–246. [In Russian.]
- 2707—OKABE, K., TANAKA, T. & UMENO, N., 1960. [Department of Parasitology, Kurume University School of Medicine, Kurume, Japan.] [Immunological studies on acute and subacute schistosomiasis japonica.] **Journal of the Kurume Medical Association**, 23 (5), 1928–1930. [In Japanese: English summary p. 1930.]
- 2708—OLSEN, L. J. & EWERT, A., 1960. "Immunological tolerance studies with white mice and *Trichinella spiralis*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 22–23.
- 2709—O'ROURKE, F. J., 1961. [Department of Zoology, University College, Cork, Republic of Ireland.] "Presence of blood antigens in fish mucus and its possible parasitological significance." [Correspondence.] **Nature, London**, 189 (4768), 943.  
O'Rourke found that three antigen-antibody reactions occurred when anti-bass (*Labrax morone*) serum was treated with bass mucus using the Consden-Kohn cellulose acetate membrane technique [see **Nature, London**, 183 (4674), 1512]. The reactions were stronger with body mucus than with gill mucus. The results of this study show that some of the serum protein antigens of fishes are secreted in mucus; such species-specific antigens may be responsible, at least in part, for the ability of certain fish parasites to detect their specific hosts.  
J. W. Smith
- 2710—PELLEGRINO, J. & RODRIGUES, B. A., 1960. [Instituto Nacional de Endemias Rurais, Centro de Pesquisas de Belo Horizonte, Brazil.] "The influence of Seitz filtration on the activity of *Schistosoma mansoni* (adult worm) antigen." **Journal of Parasitology**, 46 (5), 647.  
After Seitz filtration the nitrogen content of antigenic extracts of adult *Schistosoma mansoni* decreased from 0.048 mg. per ml. to 0.004 mg. per ml.; most of the filtrate nitrogen was non-proteinous. Taking a wheal area of 1.2 sq.cm. as a minimum for a positive intradermal test, all of 21 patients with active schistosomiasis mansoni were positive when a non-filtered extract was used, whereas only one was positive with the same extract after Seitz filtration. Pellegrino & Rodrigues suggest that sterilization of extracts by heating them to 56°C. for one hour on each of three consecutive days is better than Seitz filtration since the skin test activity is not significantly altered by this procedure.  
J. W. Smith
- 2711—RITTERSON, A. L., 1960. "Attempts to modify innate resistance of Chinese hamsters to *Trichinella spiralis*." [Abstract.] **Journal of Parasitology**, 46 (5, Sect. 2), 22.  
The innate resistance of Chinese hamsters to the muscle phase of *Trichinella spiralis* was not affected by the administration of 0.5 unit ACTH twice daily. Methyl testosterone (0.6 mg. per day or more) resulted in a small increase in carcass larva yields after 35 days of infection. Neither 6-mercaptopurine (0.1 mg. and 0.2 mg. per day) nor infection with *Leishmania donovani* (used as an R-E cell blocking agent) altered the resistance and infective doses of as many as 1,200 larvae did not break it down. Concentrated extracts of golden hamster carcass were administered to *Trichinella*-infected Chinese hamsters and did not influence resistance; extracts of Chinese hamster carcasses did not inhibit the establishment of *Trichinella* larvae in the muscles of golden hamsters. Chinese hamsters on a diet containing 2% cod liver oil for prolonged periods showed a significant lessening of innate resistance.  
S. Willmott
- 2712—SHULTZ, R. S. & ANDREEVA, N. K., 1960. [A study of age immunity in experimental animals (strobilocerci in mice).] **Trudi Instituta Zoologii. Akademiya Nauk Kazakhskoi SSR**, 12, 104–108. [In Russian.]  
*Hydatigera taeniaeformis* oncospheres were administered to mice three to 38 days old, at the rate of 25 per gm. of body-weight. The mice were divided into five age groups and the experiment lasted 22 days. Mice three to six days old did not become infected but over this age the susceptibility increased to reach its maximum in the 25 to 30-day-old group and then decreased again.  
N. Jones



- 2713**—SMITHERS, S. R. & WALKER, P. J., 1961. [National Institute for Medical Research, The Ridgeway, Mill Hill, London, England.] "Serum protein changes in monkeys infected with *Schistosoma mansoni*, with special reference to the metabolism of albumin." **Experimental Parasitology**, **New York**, **11** (1), 39-49.

Studies were carried out on serum protein changes in seven Rhesus monkeys using the biuret method of protein determination and paper electrophoresis. The value for each protein fraction was calculated from the paper electrophoretic patterns. In addition the blood volume and the distribution of the metabolism of albumin were investigated in three monkeys using  $I^{131}$ -labelled albumin. A change in serum protein occurred six to seven weeks after the initial infection and about the time when eggs first appeared in the faeces. This is attributed to an increase in the total protein concentration and also to an increase in the  $\gamma$ -globulin concentration. When previously infected monkeys were challenged with a large number of cercariae similar protein changes occurred earlier, namely, two weeks after exposure. Studies with radio-labelled albumin show that associated with the change in serum proteins there is a fall of total body and intravascular albumin and this is followed by subsequent rapid recovery and a marked increase in the intravascular albumin metabolic rate. The authors mention that serum protein changes similar to those reported in schistosome-infected monkeys have been described in other parasitic infections including malaria, trypanosomiasis, trichinelliasis, trichostrongylosis and Fasciola infection and they conclude that the changes are probably a manifestation of a common non-specific response by the host to an invasion by parasites.

E. J. L. Soulsby

- 2714**—SORESCO, A. & PANAITESCO, D., 1958. "Contribution à l'étude du diagnostic immunobiologique de l'ascaridiose par la méthode de la microprécipitation sur les larves vivantes (Leikina)." **Archives Roumaines de Pathologie Expérimentale et de Microbiologie**, **17** (3/4), 553-562. [English, German & Russian summaries pp. 561-562.]

The authors describe experiments which, for the first time, serve to confirm those of Leikina *et al.* [for abstracts see Helm. Abs., **25**, Nos. 465g & 465s] who demonstrated the presence of specific precipitating antibodies in the serum of recently infected animals (guinea-pigs) in the pulmonary phase of *Ascaris* infection. Antibodies appear on the fifth day after infection. Precipitates are formed first at the anterior and later at the posterior extremity of larvae but do not occur unless the larvae have lost their envelope.

W. M. Fitzsimmons

- 2715**—SOULSBY, E. J. L., 1961. [Department of Animal Pathology, University of Cambridge, Cambridge, England.] "Some aspects of the mechanism of immunity to helminths." **Journal of the American Veterinary Medical Association**, **138** (7), 355-362.

Soulsby discusses some ways in which defensive mechanisms against helminths are produced and how they act. Excretions from living larvae play a significant antigenic part of a protective nature at different stages (particularly at moulting) as do the viable larvae themselves. Immunization by infection produces the best immunity (antibodies produced by non-viable passive antigen produced by conventional techniques do not appear to give protection) and this may be modified by preventing immunizing larvae from reaching patency by X-irradiation etc. Antigens produced at different larval stages appear to give protection against the corresponding stages of a later attack—"each larval stage induces its own degree of qualitative immunity". The phenomenon of self-cure is examined in some detail. At present we must rely on living larvae at different stages to provide the essential "protective" antigens; in the future techniques may make it possible to collect materials released from moulting larvae *in vitro* for the preparation of non-viable parenteral vaccines. The response of eosinophil leucocytes to parasite invasion and the fact that this is greatly enhanced on immunization is being actively investigated.

W. M. Fitzsimmons

- 2716**—SOULSBY, E. J. L. & STEWART, D. F., 1960. [Department of Animal Pathology, University of Cambridge, Cambridge, England.] "Serological studies of the self-cure reaction in sheep infected with *Haemonchus contortus*." **Australian Journal of Agricultural Research**, **11** (4), 595-603. Serological reactions were followed before the administration of infective *Haemonchus contortus* larvae, through the self-cure reaction, and until the serological response had faded. Agar diffusion (Ouchterlony) reactions tended to be more pronounced when the C.F. titres were

high. Injection of worm-free sheep subcutaneously with sheathed or exsheathed larvae gave rise to sera which reacted to antigens prepared from heated and unheated larval extracts, exsheathing fluid and "metabolic products" derived from saline in which exsheathed larvae had been incubated for 24 hours at room temperature. The production of an additional line, in agar diffusion preparations, by exsheathed larvae is considered to provide evidence that injected exsheathed larvae underwent a further ecdysis, whereas sheathed larvae did not. C.F. titres rose after self-cure, with similar rises in haemagglutination titres, and declined in the few succeeding weeks, but haemagglutination titres declined more slowly and persisted at quite high levels for long periods. Neither the height nor the duration of the serological reactions indicated whether the sheep would resist the superimposed infection. Haemagglutinins could be absorbed out completely but left significant, but reduced titres in C.F. tests. Incomplete antibody titres up to 1:60,000 were recorded but had no relationship to resistance to infection. The main antigenic stimuli of the self-cure reaction appeared to be derived from the third ecdysis in the abomasum, which provides further evidence that the moulting period is important in the stimulation of immune responses to helminth infections. Conventional serological techniques reflected the immunological responses of the host to antigenic stimulation by the parasite but did not measure precisely the reactions which inhibit the parasite's development.

H. McL. Gordon

**2717**—TAFS, L. F., 1960. [Department of Animal Pathology, School of Veterinary Medicine, Cambridge, England.] "Immunization of guineapigs against *Ascaris suum*." **Journal of Helminthology**, **34** (3/4), 347-348.

Taffs showed by controlled experiments that guinea-pigs inoculated intravenously with 2,000 third-stage larvae of pig *Ascaris*, as well as guinea-pigs fed 10,000 *Ascaris* eggs *per os*, became 77% resistant to a challenge of 250,000 ova, 12 and 18 days later respectively. This shows that a previous intestinal and hepatic larval penetration are not essential for production of the immune state.

W. M. Fitzsimmons

**2718**—TIKTIN, N. V., 1958. [The resistance of potato to the potato nematode (*Heterodera rostochiensis* W.).] **Dokladi Vsesoyuznoi Ordona Lenina Akademii Selskokhozyaistvennikh Nauk Imeni V. I. Lenina**, Year 1958, No. 9, pp. 24-28. [In Russian.]

Wild varieties of potato and their hybrids were tested for resistance to *Heterodera rostochiensis*. *Solanum ballsii* was fully resistant. Hybrids obtained on cross pollination with mixed pollen of *S. phureja* variety Kameraz and *S. schreieri* were highly resistant, cysts being present on none to 12% of plants. *S. catarrhnum* and one of its hybrids were also highly resistant, with only occasional cysts on the roots, and *S. andigenum* was fairly resistant. Resistance of *S. suurense*, as observed by some workers outside Russia, was not confirmed.

G. I. Pozniak

**2719**—TOZZINI, F., 1957. "Alcuni aspetti immunitari nelle malattie parassitarie." **Zooprofilassi**, **12** (12), 913-919.

Tozzini reviews the literature on certain aspects of immunity to protozoan and helminth parasites.

W. M. Fitzsimmons

**2720**—TROMBA, F. G. & BAISDEN, L. A., 1960. "Diagnosis of experimental stephanuriasis in swine by a double diffusion agar precipitin technique." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 29.

Sera from pigs four to 14 weeks after experimental infection with *Stephanurus dentatus* form precipitates with antigens from juvenile and adult kidney worms when tested by a micro-Ouchterlony technique. The position and shape of the specific precipitin lines were constant throughout this period. Precipitin lines were also found with sera of pigs infected with other nematodes when tested against the kidney worm antigens but differences in their position and shape made them readily distinguishable from those formed in the homologous system.

S. Willmott

**2721**—VAN PEENEN, P. F. D. & KENT, H. N., 1960. "Extraction of immunologically active protein complexes from *Trichinella spiralis* larvae." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 23. The extraction of antigens from *Trichinella spiralis* larvae is described. Over two-thirds of



the extractable material (54% of the powder obtained after removal of lipids by absolute ethanol and anhydrous ether at  $-70^{\circ}\text{C}.$ ) were found to be water-soluble and the major soluble components were identified as glycoproteins. The antigenicity was tested. S. Willmott

**2722**—VAN ZANDT, P. D., 1961. [University of North Carolina, U.S.A.] "Studies on the immunity relationships in white mice given infections with *Nematospiroides dubius* Baylis, 1926 (Nematoda: Heligmosomidae)." **Dissertation Abstracts**, **21** (7), 1920.

A striking degree of immunity was induced in mice following three stimulating infections of *Nematospiroides dubius*, even when the adult worms were removed by treatment with carbon tetrachloride soon after their appearance in the intestine. This indicates that it is the tissue-invading larvae, not the adult worms, which in some way bring about immunity. An artificially acquired immunity was produced in mice by injecting an antigen prepared from *N. dubius* larvae. J. W. Smith

**2723**—VILLELLA, J. B., GOMBERG, H. J. & GOULD, S. E., 1960. "Immunity in white mice produced by feeding irradiated *Ascaris* larvae." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 24. The authors state that immunity to pig *Ascaris* infection was induced in mice by an initial infection with second-stage *Ascaris* larvae irradiated with gamma rays from cobalt 60. S. Willmott

**2724**—WADE, A. E., FOX, L. E. & SWANSON, L. E., 1960. [School of Pharmacy, University of Georgia, Athens, Georgia, U.S.A.] "Studies on infection and immunity with the cattle lungworm, *Dictyocaulus viviparus* (Bloch). II. Reinfection immunity in guinea pigs." **American Journal of Veterinary Research**, **21** (84), 758-760.

Increased resistance to infection in guinea-pigs as a result of a previous infection with *Dictyocaulus viviparus* was manifested by smaller and fewer worms in the lungs in reinfected animals. A specific antibody present in guinea-pigs infected and challenged with *D. viviparus* larvae was demonstrated (pronounced sensitivity of the ilia—Schultz-Dale test). An unexpected absence of complement-fixing antibody in challenged animals is probably due to the presence of fewer worms in the lungs, assuming that antibody is produced in response to their presence in this organ. W. M. Fitzsimmons

**2725**—WADE, A. E., SWANSON, L. E. & FOX, L. E., 1961. [Department of Veterinary Science, University of Florida, Gainesville, Florida, U.S.A.] "Studies on infection and immunity with the lungworm, *Dictyocaulus viviparus* (Bloch). I. Active immunization of guinea pigs and rabbits." **American Journal of Veterinary Research**, **22** (86), 123-127.

Experiments using lyophilized third-stage *Dictyocaulus viviparus* larvae, lyophilized mature *D. viviparus*, lung exudates or lymph nodes as antigens in guinea-pigs and rabbits produced evidence, based on worm burdens and complement fixing antibody titres, that antibodies providing resistance to lungworm infection are produced by these agents. W. M. Fitzsimmons

**2726**—WALZER, M. & BOWMAN, K. L., 1960. "Leukocytic transfer of immediate-type hypersensitiveness in man. V. Transfer of experimental sensitivity to *Ascaris* antigen." **Proceedings of the Society for Experimental Biology and Medicine**, **105** (2), 246-249.

It is generally considered that it is only delayed (tuberculin type) hypersensitiveness in man which is transferable by peripheral blood leucocytes; however, the authors have been able to demonstrate that immediate type hypersensitiveness is transferable by peripheral blood leucocytes in the case of *Ascaris* sensitization. The donors of the blood leucocytes were sensitized by repeated intracutaneous injections of *Ascaris* antigen and leucocytes from these patients transferred the immediate type hypersensitivity which is characteristic of *Ascaris* infection, whereas serum failed to do so. Pronounced sensitivity in the donor did not appear to be a prerequisite for leucocytic transfer of the immediate type hypersensitiveness.

E. J. L. Soulsby

**2727**—WEINMANN, C. J. & HUNTER, III, G. W., 1961. [Department of Microbiology, College of Medicine, University of Florida, Gainesville, Florida, U.S.A.] "Studies on schistosomiasis. XVI. The effect of immune serum upon egg production by *Schistosoma mansoni* in mice." **Experimental Parasitology**, **New York**, **11** (1), 56-62.

Immune serum obtained from mice which had been exposed on six occasions to cercariae

of *Schistosoma mansoni* was given intraperitoneally in 0.5 ml. amounts over a period of 20 days to mice which were infected with *S. mansoni*. Control mice received serum from uninfected mice on a similar schedule. The immune serum used in these experiments was positive for the following serological tests—the circum-oval precipitin test, the miracidial immobilization test and the CHR reaction. On the 54th day of infection all animals were killed and the schistosomes were recovered by perfusion technique. No statistically significant differences in worm development, egg production or the distribution of eggs were noted in the groups receiving immune serum, normal serum or physiological saline.

E. J. L. Soulsby

## Anthelmintics

**2728**—ANON., 1958. "Current concepts in therapy. Anthelmintic therapy. I." *New England Journal of Medicine*, **259** (7), 341–342.

**2729**—ARMOUR, J., HART, J. A., LEE, R. P. & ROSS, J. G., 1961. [Cooper Technical Bureau, Berkhamsted, Herts, England.] "The anthelmintic efficiency of bephenium hydroxynaphthoate against the pre-patent stages of gastro-intestinal strongyles in Nigerian zebu cattle." *Veterinary Record*, **73** (10), 234–237.

Bephenium hydroxynaphthoate administered to artificially infected zebu calves at the rate of 225 mg. per kg. body-weight was very effective against the fifth larval stages of *Haemonchus* spp. and *Oesophagostomum radiatum* and the fourth and fifth larval stages of *Cooperia* spp. Some anthelmintic action is also recorded against the fifth larval stage of *Trichostrongylus axei* and the fourth larval stage of *O. radiatum*. Fourth-stage larvae of *Haemonchus* spp. and *T. axei* were not effectively removed. Observations on the prepatent period for some of these strongyles are recorded. Practical applications in Nigeria are discussed. W. M. Fitzsimmons

**2730**—AUSTIN, W. C., LUNTS, L. H. C., POTTER, M. D. & TAYLOR, E. P., 1959. "Chemotherapeutic properties of some new quaternary ammonium salts. Part I. Chemistry." *Journal of Pharmacy and Pharmacology*, **London**, **11** (2), 80–93.

**2731**—BEHRENS, H., 1960. [Tiergesundheitsamt der Landwirtschaftskammer, Hannover, West Germany.] "Behandlung des Leberegelbefalls der Schafe mit Hetol<sup>R</sup>." *Deutsche Tierärztliche Wochenschrift*, **67** (17), 467–470. [English summary p. 470.]

Trials with 1,4-bis-trichlormethyl-benzol (Hetol) at an oral dosage rate of 25 c.c. of an 85% watery suspension for lambs over five months and 50 c.c. for adult sheep showed that it was superior to hexachlorethane in the treatment of fascioliasis. The drug is well tolerated but it is recommended that the animals should not have access to sugar-beet for at least one day before and two or three days after treatment.

W. M. Fitzsimmons

**2732**—BROOME, A. W. J. & GREENHALGH, N., 1961. [Imperial Chemical Industries Ltd., Pharmaceuticals Division, Alderley Park, Macclesfield, Cheshire, England.] "A new anthelmintic with unusual properties." [Correspondence.] *Nature*, **London**, **189** (4758), 59–60.

Broome & Greenhalgh have found 2-( $\beta$ -methoxyethyl)-pyridine to be more effective against *Nematospiroides dubius*, *Nippostrongylus muris* and *Heterakis spumosa* infections in mice than either phenothiazine or mixtures of bephenium embonate and bephenium hydroxynaphthoate. The new anthelmintic, which is a liquid extremely soluble in water, is more active when given subcutaneously than orally. The structural formula of the compound is given. Further tests with the compound are in progress under the Imperial Chemical Industries brand name Promintic.

J. W. Smith

**2733**—BRUCE, J. I., LUTTERMOSER, G. W. & McMULLEN, D. B., 1959. "The curative activity of 1-maleinyl-4-(3'-chloro-4'-methyl-phenyl)-piperazine (Hoechst S 688) in experimental schistosome infections." [Abstract.] *Journal of Parasitology*, **45** (4, Sect. 2), 55.



**2734**—BURROWS, R. B. & HUNT, G. R., 1960. [Wellcome Research Laboratories, Tuckahoe, New York, U.S.A.] "A new dihydrotriazine effective against *Syphacia obvelata* in mice." **Journal of Parasitology**, **46** (6), 873-876.

The action of a new dihydrotriazine, B.W. 58-232, was compared with that of piperazine citrate in single doses against *Syphacia obvelata* in mice. B.W. 58-232 is less toxic (oral LD<sub>50</sub> of over 20 gm. per kg. body-weight) than piperazine citrate (LD<sub>50</sub> of over 13.5 gm. per kg.), it eliminates both mature and immature *Syphacia* (piperazine is less effective against immature worms), it acts over a longer period of time and clears a larger percentage of mice; it is not soluble but is effective in and readily mixed with food.

W. M. Fitzsimmons

**2735**—DHATT, M. S. & BAM, H. L., 1959. "Some styryl derivatives of 4(3)-quinazolones as potential filaricides." [Correspondence.] **Current Science, Bangalore**, **28** (9), 367.

**2736**—DICKSON, W. M. & DUNLAP, J. S., 1960. [College of Veterinary Medicine, Washington State University, Pullman, Washington, U.S.A.] "The action of phenothiazine on the metabolism of infective nematode larvae." **Journal of Parasitology**, **46** (6), 867-872.

Dickson & Dunlap report on an investigation of the site of action of phenothiazine on third-stage infective nematode larvae cultured from ovine faeces. It was shown that embryonation of nematode eggs was prevented at a concentration of 0.0013M in the faeces (dry weight) and hatching inhibited at 0.003M, that the presence of bile did not increase phenothiazine absorption into larvae, that inhibition of oxygen uptake in the presence of phenothiazine amounted to between 20% and 40%, and that when labelled substrates were used phenothiazine inhibited production of radio-active carbon dioxide, it also inhibited the rate of methylene blue reduction by the larvae in the presence of  $\alpha$ -ketoglutaric acid but not of succinic acid.

W. M. Fitzsimmons

**2737**—DOUGLAS, J. R. & BAKER, N. F., 1959. [University of California, School of Veterinary Medicine, Davis, California, U.S.A.] "Ruelene, an organic phosphate, as an anthelmintic in sheep." **Journal of the American Veterinary Medical Association**, **135** (11), 567-569.

When 4-tert.-butyl-2-chlorophenyl methyl methylphosphoramidate (Ruelene) was tested in sheep at a dosage rate of 200 mg. per kg. body-weight no toxic side effects were observed and considerable anthelmintic activity was noted against *Ostertagia* sp., *Trichostrongylus axei*, *T. vitrinus* and *Nematodirus* sp.; good, but somewhat less effective, action was observed against *T. colubriformis*.

W. M. Fitzsimmons

**2738**—EISA, A. M. & RUBIN, R., 1960. "Bephenium hydroxynaphthoate: a new and promising gastrointestinal anthelmintic for cattle." [Abstract.] **Journal of Parasitology**, **46** (5, Sect. 2), 8.

Bephenium hydroxynaphthoate at the dosage rate of 250 mg. per kg. body-weight was shown by faecal egg counts and post-mortem examination to be 100% effective against *Nematodirus helvetianus* in four yearling calves. The average reductions in worm burdens of other trichostrongylids were: *Ostertagia ostertagi* 85%, *Trichostrongylus axei* 87%, *Cooperia oncophora* 99%, *Oesophagostomum radiatum* 100% and *Chabertia ovina* 99%. No side effects were observed.

S. Willmott

**2739**—GALLAGHER, C. H., 1961. [Division of Animal Health, McMaster Laboratory, C.S.I.R.O., Glebe, N.S.W., Australia.] "The pathology and prophylaxis of poisoning by carbon tetrachloride." **Australian Veterinary Journal**, **37** (4), 131-134.

**2740**—GIBSON, T. E., 1961. [Central Veterinary Laboratory, New Haw, Weybridge, Surrey, U.K.] "Controlled tests with three organic phosphorus compounds as anthelmintics against *Haemonchus contortus* in sheep." **Veterinary Record**, **73** (10), 230-231.

As an anthelmintic for sheep artificially infected with *Haemonchus contortus* 0,0-dimethyl 0-2,4,5-trichlorophenyl phosphorothioate (Trolene) given at the rate of 100 mg. per kg. body-weight was 31% efficient; 0,0-dimethyl 2,2,2-trichloro-1-hydroxymethyl phosphonate (Neguvon) at the rate of 100 mg. per kg. was 100% efficient; 4-tert.-butyl-2-chlorophenyl methyl methylphosphoramidate (Ruelene) at the rate of 75 mg. per kg. was 91% efficient. It is stressed that further study of the activity and toxicity of these compounds is required before their general use can be recommended.

W. M. Fitzsimmons

- 2741—GROVES, T. W., 1961. [I.C.I. Ltd., Pharmaceuticals Division, Alderley Park, Macclesfield, Cheshire, U.K.] "A summary of anthelmintic and toxicity results from field trials with methyridine." **Veterinary Record**, **73** (9), 196–201.

Groves summarizes the evidence, collected at therapeutic and toxicity trials in the field, on the use of methyridine administered subcutaneously at the rate of 200 mg. per kg. body-weight. In the treatment of parasitic gastro-enteritis in sheep and cattle the drug produces a rapid favourable clinical response in illness caused by abomasal and intestinal nematodes and there is the possibility of some activity against nematodes in the lungs. Tolerance of the drug is good but sometimes there is a local reaction at the site of injection. W. M. Fitzsimmons

- 2742—HAMMOND, J. B. & McCOWEN, M. C., 1960. [Lilly Laboratory for Clinical Research, Marion County General Hospital, Indianapolis, Indiana, U.S.A.] "The treatment of enterobiasis with new formulations of dithiazanine iodide." **American Journal of Tropical Medicine and Hygiene**, **9** (5), 500–502.

Hammond & McCowen have compared the therapeutic and side effects of commercially prepared dithiazanine iodide tablets and four new formulations of dithiazanine iodide tablets (having different disintegration times in stimulated intestinal fluid) in the treatment of 124 teen-age boys and girls infected with *Enterobius vermicularis*. 300 mg. of dithiazanine iodide tablets containing a methylcellulose core given daily for five days showed 100% cure of 23 patients and a lower incidence of vomiting and other side effects than any other preparation. It is suggested that the incidence of side effects is related to the concentration of the drug in the intestinal contents, so a tablet which dissolves slowly may be more important in reducing side effects than one which breaks up at lower levels of the intestine. J. W. Smith

- 2743—HERLICH, H., PORTER, D. A. & ISENSTEIN, R. S., 1961. [Regional Animal Disease Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Auburn, Alabama, U.S.A.] "Anthelmintic activity of Ruelene administered to cattle orally and topically." **Veterinary Medicine**, **56** (5), 219–221.

The organic phosphate compound 4-tert.-butyl-2-chlorophenyl methyl methylphosphoramidate (Ruelene) was given orally and topically to cattle and its anthelmintic action and its toxicity were observed. At an oral dosage rate of 60 mg. of active material per kg. body-weight toxic effects were observed but not at doses between 10 mg. and 50 mg. per kg. Between 40 mg. and 60 mg. per kg. anthelmintic activity against *Haemonchus placei*, *Cooperia punctata* and *Oesophagostomum radiatum* was observed. Activity against *Trichostrongylus axei*, *T. colubriformis* and *Ostertagia ostertagi* was only noted at the dangerous level of 60 mg. per kg. orally. With topical administration (an emulsifiable preparation in water at the rate of 75 mg. per kg. applied to the back) some activity was noted against *H. placei*, *C. punctata*, *C. oncophora* and *Oesophagostomum radiatum*. W. M. Fitzsimmons

- 2744—LÄMMLER, G., 1960. "Chemotherapeutische Untersuchungen mit Hetol® einem neuen, hochwirksamen Leberegelmittel." **Deutsche Tierärztliche Wochenschrift**, **67** (15), 408–413. [English summary p. 413.]

Trials with 1,4-bis-trichlormethyl-benzol (Hetol) against *Fasciola hepatica* in rats, rabbits, sheep and cattle gave encouraging results. In sheep the minimum curative dose is 150 mg. per kg. body-weight *per os* and in cattle 136 mg. per kg. *per os*. The therapeutic index is 10 for sheep and 3 for cattle so that there is a good margin of safety in treatment. W. M. Fitzsimmons

- 2745—LANDRAM, J. F., 1959. [Agricultural Research Department, Dow Chemical Co., Lake Jackson, Texas, U.S.A.] "Anthelmintic activity in cattle and sheep of three new phosphoramidothioates." [Abstract.] **Journal of Parasitology**, **45** (4, Sect. 2), 56.

- 2746—LANDRAM, J. F. & SHAVER, R. J., 1959. [Agricultural Research Department, Dow Chemical Co., Lake Jackson, Texas, U.S.A.] "Anthelmintic activity of a new organic phosphate in cattle and sheep." [Abstract.] **Journal of Parasitology**, **45** (4, Sect. 2), 55–56.



**2747**—LINK, R. P., 1961. [Department of Physiology & Pharmacology, College of Veterinary Medicine, University of Illinois, Urbana, Illinois, U.S.A.] "Anthelmintic activity of some phosphorus compounds." *Illinois Veterinarian*, **4** (1), 30–31.

Link reviews the organic phosphate compounds with regard to their value and limitations as insecticides and anthelmintics in domestic ruminants and the possible toxic side effects of their administration.

W. M. Fitzsimmons

**2748**—LUTTERMOSER, G. W., 1959. [U.S. Department of Health, Education and Welfare, Public Health Service, National Institutes of Health, National Institute of Allergy and Infectious Diseases, Bethesda, Maryland, U.S.A.] "Studies on chemotherapy of experimental schistosomiasis. V. Enhancement of the schistosomicidal activity of tartar emetic and stibophen by glycerin." *Journal of Parasitology*, **45** (3), 301–309.

Luttermoser has attempted to increase the schistosomicidal activity of tartar emetic and stibophen by the addition of one of several possible organic adjuvants; only glycerin, of 32 compounds tested, was successful. 50 mg. or 75 mg. of tartar emetic per kg. body-weight given orally twice a day for five days or 160 mg. of stibophen per kg. given intraperitoneally six times in five days reduced *Schistosoma mansoni* infection in mice by about 50%. The same regimen of tartar emetic given in a 50% aqueous solution of glycerin reduced the infection by about 74%; the same regimen of stibophen given in a 25% aqueous solution of glycerin reduced the infection by about 79%. Glycerin given alone either orally or parenterally did not kill any schistosomes. Multiple injections of 25% glycerin solutions of tartar emetic or stibophen into the tail vein of mice usually resulted in haematoma and leakage of the drug into the tissues. The acute toxicity of both tartar emetic and stibophen for uninfected mice was similar irrespective of whether the drugs were given in aqueous or in glycerin solution or as single or multiple doses; similar results were obtained with uninfected dogs. Luttermoser discusses the possible ways in which glycerin might enhance the activity of these drugs; the stability of tartar emetic *in vitro* was increased by the addition of glycerin, which suggests that *in vivo* this adjuvant could maintain the level of the drug in the blood for a longer period of time so enhancing its activity.

J. W. Smith

**2749**—LUTTERMOSER, G. W., BRUCE, J. I. & McMULLEN, D. B., 1959. [National Institutes of Health, Bethesda, Maryland, U.S.A.] "The prophylactic activity of 1-maleinyl-4-(3'-chloro-4'-methyl-phenyl)-piperazine (Hoechst S 688) in experimental schistosome infections." [Abstract.] *Journal of Parasitology*, **45** (4, Sect. 2), 54–55.

[For abstract of full account of this work see No. 2750 below.]

**2750**—LUTTERMOSER, G. W., BRUCE, J. I. & McMULLEN, D. B., 1960. [Laboratory of Parasite Chemotherapy, National Institute of Allergy and Infectious Diseases, N.I.H., P.H.S., U.S. Department of Health, Education & Welfare, Bethesda, Maryland, U.S.A.] "The prophylactic and curative activity of 1-maleinyl-4-(3'-chloro-4'-methyl-phenyl)-piperazine (Hoechst S 688) in experimental schistosome infections." *American Journal of Tropical Medicine and Hygiene*, **9** (1), 39–45.

Luttermoser *et al.* have tested the prophylactic and curative activity of 1-maleinyl-4-(3'-chloro-4'-methyl-phenyl)-piperazine sodium salt (Hoechst S 688) against experimental infections of *Schistosoma mansoni* in mice and monkeys and *S. japonicum* in dogs. Treatment of *S. mansoni* in monkeys with 240 mg. per kg. body-weight of S 688 for two days was successful but approached toxic levels. 10 mg. per kg. of the drug given once daily for five days did not affect *S. japonicum* in a dog. 72 mg. per kg. or 120 mg. per kg. of S 688 given to mice up to 72 hours after exposure to *S. mansoni* cercariae brought about a significant reduction in worm burdens compared with those of control mice; this was not observed for monkeys. Slight prophylactic activity of the drug was observed in preventing the development of *S. japonicum* in dogs given the drug for three days following exposure to cercariae. These findings are in agreement with those of Lämmler [for abstract see Helm. Abs., **27**, No. 317a].

J. W. Smith

**2751**—LYNCH, J. E. & NELSON, B., 1959. [Parasitology Laboratory, Pfizer Therapeutic Institute, Maywood, New Jersey, U.S.A.] "Preliminary anthelmintic studies with *Nematospiroides dubius* in mice." *Journal of Parasitology*, **45** (6), 659–662.

Lynch & Nelson have tested the effectiveness of Compound 1871 (2-thienylmethyl 2-imidazolyl sulphide hydrochloride) against *Nematospiroides dubius* in mice. The structural

formula of the drug is given. Single doses of 25 mg. of Compound 1871 per kg. body-weight brought about a worm reduction of 92% and cleared 63% of the infection in 19 mice. The results of higher single and multiple doses of the drug are tabulated. Parallel tests with various established anthelmintics against *N. dubius* in mice showed Compound 1871 to be superior. [See also Helm. Abs., 27, No. 247db.] J. W. Smith

**2752**—MACRAE, R. R., 1961. [18 York Place, Perth, Scotland.] "A clinical evaluation of methyridine in normal veterinary practice." *Veterinary Record*, 73 (9), 193-195.

Macrae reports on results obtained in field trials with methyridine in parasitic gastro-enteritis in cattle and sheep. Case histories are given of severe outbreaks in which uniformly beneficial results were obtained with the drug but some cases of local reaction at the site of injection were noted. W. M. Fitzsimmons

**2753**—NAGATY, H. F. & KHALIL, H. M., 1960. [Department of Parasitology, Faculty of Medicine, Ein-Shams University, Cairo, Egypt.] "Piperazine adipate in *Heterophyes heterophyes* and other helminth infections." [Correspondence.] *Lancet*, Year 1960, 1 (7131), 978.

20 patients of various ages infected with *Heterophyes heterophyes* were treated with piperazine adipate. The dose varied between 0.9 gm. and 4.5 gm. daily over a period of two to ten days; the total dose ranged from 6.3 gm. to 22.5 gm. Stool examinations were performed every other day for one month. Eight of the 20 cases stopped passing *H. heterophyes* eggs after four to five days' treatment and another three patients stopped passing eggs after six to seven days' treatment. Treatment of three cases of ascariasis, two of *Trichuris* and one case each of *Trichostrongylus* and *Enterobius* with piperazine adipate was successful; treatment of one case each of ancylostomiasis and *Hymenolepis nana* was unsuccessful. Side effects of the drug were slight; there was slight dizziness in those patients taking over 3.6 gm. of the drug daily.

J. W. Smith

**2754**—NATT, M. P., SCHULTES, L. & GUSTAFSON, R. R., 1960. "Comparative antioxyrid activities of NF-427 (1-(p-chlorophenyl)-3-(5-nitro-2-furyl)-2-propen-1-one), NF-23 (ethyl 3-(5-nitro-2-furyl) acrylate) and piperazine citrate against the mouse pinworm, *Syphacia obvelata*." [Abstract.] *Journal of Parasitology*, 46 (5, Sect. 2), 11-12.

When NF-23, NF-427 and piperazine citrate were compared against *Syphacia obvelata* in mice, using graded dosages for one, two, four and eight days, NF-427 produced higher rates of cure at lower dose levels than did the two other drugs. NF-427 and piperazine citrate were more active against mature worms than was NF-23. S. Willmott

**2755**—PIKE, E. H., 1960. [Department of Tropical Medicine and Public Health, Tulane Medical School, New Orleans, Louisiana, U.S.A.] "Effect of diethylcarbamazine, oxophenarsine hydrochloride and piperazine citrate on *Toxocara canis* larvae in mice." *Experimental Parasitology*, New York, 9 (3), 223-232.

Pike has investigated the effects of piperazine citrate, diethylcarbamazine and oxophenarsine hydrochloride upon the hatching of *Toxocara canis* larvae in the intestine of, and the larval migration through the tissues of male mice. Daily doses of 25 mg. of diethylcarbamazine per kg. body-weight given for two seven day periods interrupted by seven days and daily doses of 1.0 mg. per kg. of oxophenarsine hydrochloride given to mice 14 to 16 days after infection with 500 *T. canis* eggs reduced the number of larvae to 35% and 77% respectively of those recovered from untreated control mice. Diethylcarbamazine and piperazine citrate were both ineffective against hatching larvae and larvae in early migration. Blood eosinophilia of variable magnitude occurred during larval migration and was apparently unaffected by either diethylcarbamazine or oxophenarsine hydrochloride. All infected mice whether treated or untreated showed signs of pneumonia during the lung migration and the presence of eggs containing viable larvae in the faeces particularly at the fourth and eighth hours after infection. Photographs show haemorrhagic lesions in the lungs of mice infected with *T. canis*. J. W. Smith



- 2756**—ROSENBERGER, G. & HEESCHEN, W., 1960. [Klinik für innere und chirurgische Rinderkrankheiten, Richard-Götze-Institut, Tierärztlichen Hochschule Hannover, West Germany.] "Behandlungsversuche gegen den Lungenwurmbefall der Rinder mit 'Certuna'-Bayer." *Deutsche Tierärztliche Wochenschrift*, **67** (15), 403–405. [English summary p. 405.]

This paper describes a trial of Certuna-Bayer (the piperazine salt of the laevulinic acid hydrazone of cyanacethydrazide) for the treatment of lungworm infections in cattle. The results showed that two doses of 60 mg. per kg. body-weight of a 30% solution, given orally, had the same effect as three doses of cyanacethydrazide. K. R. Heath

- 2757**—SHEFFIELD, H. G., MEISENHOLDER, J. E. & THOMPSON, P. E., 1959. [Research Division, Parke, Davis & Co., Detroit, Michigan, U.S.A.] "The effects of reference anthelmintics against *Nematospiroides dubius* and oxyurids in mice relative to screening procedures for new drugs. [Abstract.] *Journal of Parasitology*, **45** (4, Sect. 2), 55.

[For abstract of full account of this work see No. 2758 below.]

- 2758**—SHEFFIELD, H. G., MEISENHOLDER, J. E. & THOMPSON, P. E., 1959. [Research Division, Parke, Davis & Co., Detroit, Michigan, U.S.A.] "The effects of reference anthelmintics against *Nematospiroides dubius* and oxyurids in mice relative to screening procedures for new drugs." *Journal of Parasitology*, **45** (6), 653–658.

Sheffield *et al.* have tested 11 reference anthelmintics against mixed infections in mice consisting of naturally occurring *Syphacia obvelata* and *Aspicularis tetraptera* and experimental *Nematospiroides dubius*. Piperazine, phenothiazine, tetrachlorethylene, carbon tetrachloride, hexylresorcinol, gentian violet, pyrinium chloride, dithiazine iodide and bephenium embonate were active against one or more worms but santonin and oil of chenopodium were not appreciably active against any. New drugs may best be screened by combining administration by stomach tube with feeding of the drug in the food and by testing them against all three worms since, in the present study, neither method of administration was optimal for all drugs and no single worm was equally susceptible to all drugs. J. W. Smith

- 2759**—SIEGMANN, O. & BÜLOW, V. v., 1960. [Bundesforschungsanstalt für Kleintierzucht, Celle, West Germany.] "Weitere Untersuchungen über die Eignung von Hygromycin B zur Bekämpfung von Geflügelhelminthen." *Deutsche Tierärztliche Wochenschrift*, **67** (17), 470–474. [English summary p. 474.]

This paper is mainly concerned with the influence of hygromycin in the food ration upon the growth of chickens but the observation is made that its action on *Davainea proglottina* is only limited and that it cannot be justifiably ranked as a therapeutic agent against cestodes.

W. M. Fitzsimmons

- 2760**—STANDEN, O. D., 1961. [Wellcome Laboratories of Tropical Medicine, London, N.W.1, England.] "Antimony and the heart." [Correspondence.] *British Medical Journal*, Year 1961, **2** (5244), 108.

Attention is drawn to the risk of liver damage following the administration of trivalent antimony compounds for the radical cure of schistosomiasis, and to the need for controlled quantitative studies to define the least toxic and most effective regimen. R. T. Leiper

- 2761**—THOROLD, P. W., BOSMAN, C. J. & BAKER, J. A. F., 1959. [Cooper & Nephews S.A. (Pty.) Ltd., East London, South Africa.] "A note on the comparative efficacy of phenothiazine of different particle size under South African conditions." *Journal of the South African Veterinary Medical Association*, **30** (4), 439–445.

In these trials of phenothiazine groups of 20 adult sheep, naturally infected with *Haemonchus*, *Oesophagostomum*, *Bunostomum*, *Trichostrongylus*, *Strongyloides* and *Ostertagia* spp. were used, as well as young calves infected with *B. phlebotomum*, *Cooperia* spp., *H. contortus* and *Oesophagostomum radiatum*. Egg counts were made at weekly intervals for three weeks before and two weeks after dosing, using the Gordon & Whitlock method and the faecal culture method as described by Whitlock. Three grades of phenothiazine were used, the particle size being below 70  $\mu$ , 20  $\mu$  and 17  $\mu$  respectively. The finer material was more effective against *Trichostrongylus* and *Oesophagostomum* and equally effective against *Haemonchus*, *Bunostomum* and *Ostertagia*. In calves, egg counts were considerably reduced with all three grades but no differential larval counts are shown. R. K. Reinecke

- 2762—THORPE, E., 1961. [I.C.I. Ltd., Pharmaceuticals Division, Alderley Park, Nr. Macclesfield, Cheshire, U.K.] "Local reaction to the injection of methyridine." [Correspondence.] **Veterinary Record**, 73 (13), 330-331.

With the subcutaneous injection of methyridine skin ulceration is a constant feature in rats; in cattle and sheep oedema and focal necrosis of subcutaneous connective tissue and superficial skeletal muscles occurs within 24 hours but healing is well advanced within a week. There is no evidence, from the writer's experience, that the incidence of clostridial infection is enhanced when this drug is used with proper care. More study of the use of the drug in horses is needed.

W. M. Fitzsimmons

- \*2763—TRIPATHI, R. C., SINGH, M. M. & KOHLI, J. D., 1958. "Anthelmintic screening of substituted bis-benzothiazoles." **Indian Journal of Physiology and Pharmacology**, 2 (3), 446-451.

- 2764—YOUNG, J., 1961. [St. Martin's Lane, Brechin, Scotland.] "Observations on the use of methyridine as an anthelmintic in practice." **Veterinary Record**, 73 (9), 192-193.

The author reports that methyridine, as a single subcutaneous injection at the rate of 200 mg. per kg. body-weight in sheep and cattle, brought about a most satisfactory recovery with no side effects, even in marked clinical cases of parasitic gastro-enteritis due to strongyle nematodes, including *Nematodirus* spp.

W. M. Fitzsimmons

### History

- 2765—AHLBERG, O., 1960. [Statens Växskyddsanstalt, Solna, Sweden.] "Introductory lecture." [Report of the 5th International Symposium on Plant Nematology, Uppsala, August 10-13, 1959.] **Nematologica. Supplement II**, pp. 1-5.

This is a short account of the history of plant nematology in Sweden from 1875 to the present day. The nematode pests recorded in Sweden are discussed, with particular reference to those now causing the most trouble, namely *Heterodera rostochiensis*, *H. schachtii*, *H. avenae*, *Ditylenchus dipsaci*, *Pratylenchus pratensis* and *Aphelenchoides fragariae*.

A. M. Shepherd

- 2766—NEGhme, A., 1960. "Zenker y el descubrimiento de la triquinosis." **Boletín Chileno de Parasitología**, 15 (4), 84-85.

- 2767—SCHWARTZ, B., 1960. [2480, 16th Street, N.W., Washington 9, D.C., U.S.A.] "Discovery of trichinae and determination of their life history and pathogenicity." **Proceedings of the Helminthological Society of Washington**, 27 (3), 261-268.

Reviewing the early literature of *Trichinella spiralis*, Schwartz recalls how the cysts were discovered and the parasitic nature of their contents recognized, how the infection was conveyed to man and how, after the lapse of nearly a quarter of a century, they ceased to be considered merely zoological curiosities as a result of Zenker's epidemiological and laboratory investigations.

R. T. Leiper

### Miscellaneous

- 2768—ALWAR, V. S. & LALITHA, C. M., 1961. [Madras Veterinary College, Madras, India.] "A check-list of the helminth parasites in the Department of Parasitology, Madras Veterinary College. (Additions since 1954.)" **Indian Veterinary Journal**, 38 (3), 142-148.

- 2769—CREWE, W. & GORDON, R. M., 1959. [Helminthiasis Research Unit, West African Council for Medical Research, Kumba, Nigeria.] "The immediate reaction of the mammalian host to the bite of uninfected *Chrysops* and of *Chrysops* infected with human and with monkey *Loa*." **Annals of Tropical Medicine and Parasitology**, 53 (3), 334-340.

An adult African male infected with *Acanthocheilonema perstans* was exposed to the bites of *Chrysops* which were either uninfected or infected with either the human or the monkey strain of *Loa loa*. An immediate reaction in the form of a wheal was produced by both uninfected and infected bites which was more severe and of longer duration with an infected bite; two *Mandrillus leucophaeus* reacted only to infected bites. These reactions were probably



due to the previous sensitization of the host to some substance in the insect's saliva in the case of uninfected bites, and to some substance secreted or excreted by the invading parasite in the case of infected bites. In rare cases in man a delayed reaction may follow an infected bite which is probably due to the presence of dead filarial larvae killed by the host's defensive mechanisms.

J. W. Smith

**2770**—GOODEY, J. B., 1961. [Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, England.] "Recent developments in plant nematology." [Report of symposium held by the Association of Applied Biologists, London, January 20, 1961.] *Nature, London*, **189** (4766), 715–716.

**2771**—HOVORKA, J., 1958. "Účast sovietskej vedy na rozvoji a perspektívach helmintológie v ČSR." [The share of Soviet science in the development and prospects of helminthology in Czechoslovakia.] *Sborník Československé Akademie Zemědělských Věd. Veterinární Medicina*, **31** (12), 899–908. [English, German & Russian summaries p. 908.]

**2772**—JOYNER, L. P., 1961. "Parasite biology." [Report of meeting of the Parasitology Group of the Institute of Biology, Bristol, April 11–13, 1961.] *Nature, London*, **191** (4784), 134–135.

**2773**—RYBICKA, K., 1960. "Zastosowanie izotopów promieniotwórczych w helmintologii." *Wiadomości Parazytologiczne*, **6** (5), 381–397. [English summary p. 397.]

Rybicka reviews the literature on the use of radio-active isotopes, more especially in the control of helminths, in tests on the therapeutic efficacy of drugs, in studies of physiological changes in the host due to the parasites and in investigations on the biology and biochemistry of the parasites.

N. Jones

**2774**—SCHELL, S. C., 1960. [Department of Biological Sciences, University of Idaho, Moscow, Idaho, U.S.A.] "A case of conjoined twin rediae." *Journal of Parasitology*, **46** (4), 448.

Schell describes and figures conjoined rediae from *Physa gyrina*. The cercariae emitted encysted on lettuce and were fed to a laboratory rat. At autopsy 31 days later 17 sexually mature *Notocorylus quinqueserialis* were recovered. Although partial twinning has been recorded in miracidia and cercariae by Kuntz [for abstract see *Helm. Abs.*, **17**, No. 219c], this is the first record of this type of abnormality in a redia.

R. T. Leiper

**2775**—STAUBER, L. A., 1960. [Department of Zoology, Rutgers State University, New Brunswick, New Jersey, U.S.A.] "A goal for parasitologists." *Proceedings of the Helminthological Society of Washington*, **27** (3), 227–231.

Although confident that the practical problems in the field of parasitology will undoubtedly be solved, Stauber feels concerned lest the need of research on the more basic principles may be overlooked. More conscious effort is required in elucidating the subtle details of the relationship of host and parasite at organismic, cellular and molecular levels. There is need too for some re-arrangement and new presentation of the subject by the teacher. It is suggested that the application of brain-storming committee activity, as practised by industry, to research and to teaching should be given a trial.

R. T. Leiper

**2776**—TOBIE, J. E. & BEYE, H. K., 1960. "Fluorescence of tetracyclines in filarial worms." *Proceedings of the Society for Experimental Biology and Medicine*, **104** (1), 134–140.

Tobie *et al.* found that tetracycline antibiotics were concentrated in the tissues of microfilariae and adults of *Dirofilaria immitis*, so rendering them fluorescent in ultra-violet light. It was possible, in this way, to detect with ultra-violet light migrating subcutaneous filarial worms in the tissues of a human patient who had been dosed with antibiotics.

W. P. Rogers

**2777**—WINKLER, E. J., DOUGLAS, L. A. & PRAMER, D., 1960. "X-ray-diffraction analysis of cell walls of nematode-trapping fungi." *Biochimica et Biophysica Acta*, **45** (2), 393–395.

The major component of the cell wall of nematode-trapping hyphomycetes is chitin. The chitin content of *Arthrobotrys conoides*, *Dactylaria thaumasia* and *Dactylella ellipsospora* was estimated as 16%, 18% and 8% of the dry weight respectively.

H. R. Wallace

## BOOKS

- 2778**—BELDING, D. L., 1958. "Basic clinical parasitology." **New York : Appleton-Century-Crofts, Inc.**, vii+469 pp.

The aim of this volume is to provide the medical student and physician with the essential facts about the common parasites of man and is largely a condensation of the author's "Text-book of Clinical Parasitology". The emphasis here is on pathology and symptomology, with the morphological and biological aspects restricted to the essentials for diagnosis, and on those items of life-history that have important bearings on prevention. Only established methods of treatment and accepted technical methods of diagnosis are given in the text but detailed references to the literature on special methods are supplied. R. T. Leiper

- 2779**—DAVEY, T. H. & LIGHTBODY, W. P. H., 1961. "The control of disease in the tropics. A handbook for medical practitioners." **London : H. K. Lewis & Co. Ltd.**, 2nd edit., xii+422 pp.

- 2780**—GRABDA, E., KOZAR, Z. & ŚLUSARSKI, W., 1958. "Parasitology and parasitologists in Poland." **Warsaw : Polish Parasitological Society**, 118 pp.

The booklet gives a general review of progress in parasitological science in Poland and lists the institutions (with addresses) and workers concerned fully or partially with parasitology, indicating the subject of research undertaken. G. I. Pozniak

- 2781**—ICHINOHE, M., 1961. [National Institute of Agricultural Sciences, Nishigahara, Tokyo, Japan.] "Bibliography of phytonematology." **Tokyo : Japan Plant Protection Association**, x+198 pp.

This bibliography includes 3,186 references to plant-parasitic nematodes published up to the end of January 1961; it was prepared primarily for the use of Japanese nematode research personnel scattered throughout the country. The text is divided into seven chapters as follows: (i) handbooks, (ii) methodology, (iii) morphology and anatomy, (iv) references to higher taxa, (v) taxonomy, bionomics and biochemistry, which are divided into 59 plant-parasitic nematode genera and occupy 101 pages, (vi) general articles and (vii) nematode control. Most of the papers have been cited in **Helminthological Abstracts** and **Index Catalogue of Medical and Veterinary Zoology** and Publications-Indexes of the Section of Nematology were in part referred to in this edition. A few Japanese articles on phytonematology which are original and have a summary in other languages are also included. More than 1,000 references have a brief explanation or remarks prepared by the editor within square brackets. M. Ichinohe

- 2782**—KOTLÁN, A., 1960. "Helminthologie. Die Helminthosen der Haus- und Nutztiere unter Berücksichtigung der Helminthosen des Menschen." **Budapest : Akadémiai Kiadó**, 631 pp.

This book deals with the helminths parasitic in man, domesticated animals and other hosts of economic importance and with the diseases that they cause. Its general plan is to describe the morphology of the helminths, with keys for the identification of genera and species and to add sections on the symptoms, pathology, diagnosis, chemotherapy and control of each disease or group of diseases. When the same parasite causes disease in more than one host, the disease in each of these hosts is considered separately. Thus separate sections are given to "fasciolosis" as it affects man, cattle, sheep and swine and also to "schistosomiasis" of man, domesticated mammals and domesticated birds. This procedure has disadvantages but it does provide much detail of practical value. The sections on chemotherapy are, on the whole, weaker than the others and some of the newer remedies are not mentioned, probably because, as so often happens, these remedies came into use while the book was being printed. The only sound method, indeed, of keeping pace nowadays with the rapid progress of chemotherapy is to follow it in the pages of periodicals rather than in those of books.



The author gives seven pages of his Introduction to the philological and other justifications of the names he gives to the diseases discussed. Some of these names, such as "Dermatitis schistosomatidosa" are certainly not attractive; but the primary aim of scientific terminology is not to charm us but to eliminate all doubt of the meaning intended and certainly such terms as "solium-cysticercosis", "hydatigera-cysticercosis", "Dictyocaulosis vivipari" and "Dictyocaulosis arnfieldi" do pinpoint important distinctions. The author rejects the ending "-iasis" in favour of "-osis" and adopts, for diseases caused by more than one member of a family, the ending "-osis" added to the family name. We thus find such terms as "Ascaridatosis" and "Filariatosis", but still require, under the system here adopted, additional names for diseases caused by genera, such as "Ascaridosis", "Toxascaridosis", "Toxocarosis", "Acanthocheilonematosis" and so on. The aims of this system are no doubt precision of meaning and obedience to philology and international rules of nomenclature, but the practising veterinarian may wonder whether it helps him with the job of understanding and controlling disease. It is, after all, the sick animal that should, like the play in Hamlet, "catch our consciences". In fairness to the author of this book however, it should be said that his text and illustrations show that he fully realizes this.

The 262 line and photographic illustrations add much to the value of the book, especially perhaps for those who do not read even the comparatively simple German in which the text is written. A few illustrations are in colour and there are four plates in colour of the pathology of lungworm infections, the value of which is doubtful. Many of the other illustrations are original; others are "after" authors who are named, but the papers which contain their illustrations are not always given in the bibliography. The bibliography, indeed, gives only research papers and no books or lists of parasitological journals are given. Many references given in the text are, moreover, omitted from the bibliography, so that the only clues we have to these references are the authors' names and the years during which their papers were published. This problem, however, faces every author of a text-book nowadays and the only solution would seem to be to give key references from which further information can be obtained; and, given the author's name and the year of publication, much can be done with the help of the invaluable **Index Catalogue of Medical and Veterinary Zoology**.

The book is well produced. It uses glazed paper throughout, which helps, no doubt, clear reproduction of the illustrations but also adds to the weight of the volume, and weight is more important than some publishers seem to realize. But this is a minor criticism. The distinguished author, so well known for his original contributions to protozoology and helminthology, has given us a book which will be a useful addition to the library of every department of parasitology.

G. Lapage

**2783**—MOZLEY, A., 1960. "Consequences of disturbance. The pest situation examined." London: H. K. Lewis & Co. Ltd., x+61 pp.

**2784**—ORLOV, N. P., 1957. [Biological principles of treatment and prophylaxis of parasitic diseases.] Moscow: Gosudarstvennoe Izdatelstvo Selskokhozyaistvennoi Literatury, 158 pp. [In Russian.]

In this monograph Orlov, basing himself on Russian literature, discusses those aspects of host-parasite relationships which have a direct bearing on the treatment and prophylaxis of parasitic infections. The four sections deal with host specificity, pathogenicity, immunity and practical conclusions.

G. I. Pozniak

**2785**—PODYAPOLSKAYA, V. P. & KAPUSTIN, V. F., 1958. [Helminth diseases of man.] Moscow: Medgiz, 3rd edit., 663 pp. [In Russian.]

**2786**—SKRYABIN, K. I., 1960. [Trematodes of animals and man. Principles of trematodology. Volume XVII.] Moscow: Izdatelstvo Akademii Nauk SSSR, 643 pp. [In Russian.]

This 17th volume of the monograph is in four sections. In section 1 Skryabin presents

(basically unchanged) the families Cortrematidae, Heronimidae, Botulidae and Aphanhysteridae, and an addendum to Megaperidae (discussed in volume I) recording Cable's work on the life-cycle of *Megapera gyrina*.

Section 2 continues the revision by Skryabin & Antipin of Plagiorchioidea, dealing with the following three subfamilies of Plagiorchiidae: Encyclometrinae, Travtrematinae and Enodiotrematinae (earlier parts of the revision of this super family appeared in volume XIII and XIV).

Section 3 is the second part of Sudarikov's revision of the Strigeidida (the first part appeared in volume XVI) and deals with the Diplostomatoidea family, Diplostomatidae. The other two families in this superfamily, Alariidae and Bolbocephalodidae are revised in the following volume. The Diplostomatidae are divided into (i) the Diplostomatinae containing *Diplostomum* (of which *Neolalaria* is made a synonym, the only species becoming *D. thaparia* n.comb., and which includes Shigin's (1960) species *D. sudarikovi* [? n.sp.] from *Ardea cinerea*), *Adenodiplostomum*, *Austrodiplostomum*, *Bolbophorus*, *Glossodiplostomoides*, *Harvardia*, *Hysteromorpha*, *Lophosicyadiplostomum*, *Mesophorodiplostomum*, *Neodiplostomum*, *Ornithodiplostomum*, *Posthodiplostomum*, *Prolobodiplostomum*, *Sphincterodiplostomum* and *Tylodelphys* (of which *Glossodiplostomum* is made a synonym, the only species becoming *T. glossoides* n.comb., and to which is transferred *Diplostomum gavius* as *T. gavia* n.comb.); and (ii) Crassiphialinae n.subf. (for Dubois' Crassiphialini) containing *Crassiphiala*, *Allodiplostomum*, *Cercotyla*, *Pseudodiplostomum*, *Pulvinifer*, *Scolopacitrema*, *Subuvulifer* and *Uvulifer*.

In section 4 the revision by Skryabin & Gushanskaya of the Hemiurata (earlier parts appeared in volumes IX, X, XI, XIII, XVI) is concluded with an outline of the morphological and biological characters and the revised classification of the group, and with indexes to all the families, subfamilies, genera and species. Grassitrematinae n.subf. is erected in the Lecithasteridae for Yeh's (1954) *Grassitrema* of which *Tricotyledonia* Fife, 1954 is made a synonym [this subfamily is discussed in greater detail in volume XVIII of this monograph, p. 419.] G. I. Pozniak

**2787**—SKRYABIN, K. I., 1960. [Trematodes of animals and man. Principles of trematodology. Volume XVIII.] Moscow: Izdatelstvo Akademii Nauk SSSR, 746 pp. [In Russian.]

In this 18th volume there are three major contributions, i.e. the revision of the Allocreadiata by Skryabin & Koval, of the Strigeata by Sudarikov and of the Plagiorchioidea by Skryabin & Antipin; Skryabin also gives the characters of Cylindrorchiidae (which remain basically unchanged) and jointly with Sobolev brings up to date the Bivesiculidae (revised in Volume I). Further, there is an addendum to the Hemiurata by Skryabin & Gushanskaya which comprises recently described species and a more detailed description of the Grassitrematinae [see also abstract No. 2786 above]. *Tricotyledonia genypteri* becomes *Grassitrema genypteri* n.comb.

This second part of the revision of Allocreadiata (of which the first appeared in volume XV) deals with the Lepocreadioidae. The superfamily contains six families, i.e. Lepocreadiidae, Dermadenidae and Diploproctodaeidae (these three are revised in this volume, the last two remaining basically unchanged), Deropristidae and Schistorchiidae (revised in volume XV and XVI respectively) and Orientocreadiidae n.fam. (to appear in the following volume). Lepocreadiidae is newly divided into ten subfamilies with the following generic distribution: (i) Lepocreadiinae containing only *Lepocreadium*, *Eocreadium*, *Lepocreadioides*, *Opechona* and *Opechonoides*; *Pseudocreadium*, of which *Hypocreadium* becomes a synonym, is transferred to Dermadenidae; (ii) Aephniidiogenetinae containing *Aephniidiogenes*, *Holorchis* and *Pseudoholorchis*; (iii) Allolepidapedinae n.subf. containing *Allolepidapedon*; (iv) Folliorchinae containing *Folliorchis*, *Multitestis* and *Rhagorchis*; (v) Homalometrinae containing *Homalometron*, *Crassicutis*, *Dactylotrema*, *Microcreadium*, *Myzotus* and *Pancreadium*; (vi) Labriferinae containing *Labrifer* and *Myzoxenus*; (vii) Lepidapedinae containing *Lepidapedon* (which includes *L. ptochus* n.comb. for *Aephniidiogenes ptochus*) and *Neolepidapedon*; (viii) Marsupioacetabulinae n.subf. containing *Marsupioacetabulum*; (ix) Postporinae containing *Postporus*; and (x) Spiritestinae containing *Spiritistes* and *Hairana*.



The third part of the revision of Strigeata (earlier parts in volumes XVI and XVII) is concerned with the Diplostomatoidea and Proterodiplostomatoidea n.superf. Diplostomatoidea contains (i) Alariidae which is subdivided into Alariinae for the genera *Alaria*, *Pharyngostomoides*, *Pharyngostomum*, *Podospathalum* and *Procyotrema*, and Fibricolinae n.subf. for *Fibricola* (which includes *F. intermedia* n.comb. for *Neodiplostomum* (*Fibricola*) *intermedium*), *Cynodiplostomum*, *Didelphodiplostomum* and *Enhyridiplostomum*; and (ii) Bolbocephalodidae with the only genus *Bolbocephalodes*; the Bolbocephalodines and Bolbocephalodinae erected by Dubois in 1936 are suppressed. Proterodiplostomatoidea is erected for distomes of reptiles and includes Proterodiplostomatidae for parasites of crocodiles and turtles and Ophiodiplostomatidae n.fam. for parasites of snakes. Proterodiplostomatidae has three subfamilies: Proterodiplostomatinae containing *Proterodiplostomum* (to which is transferred *Pseudoneodiplostomum brasiliensis*), *Archaeodiplostomum* and *Mesodiplostomum*; Massoprostatinae containing *Massoprostatum*; and Polycotylineae containing *Polycotyle*, *Cheloniodiplostomum* n.g. (for *Herpetodiplostomum* ex parte with the following species included: *C. testudinis* n.comb. (type), *C. brevis* n.comb., *C. cinosterni* n.comb. and *C. delillei* n.comb.), *Crocodilicola*, *Cystodiplostomum*, *Herpetodiplostomum*, *Paradiplostomum*, *Prolecithodiplostomum*, *Pseudocrocodilicola* and *Pseudoneodiplostomum* (which is transferred from Proterodiplostomatinae and which contains *P. gavialis* n.comb. for *Crocodilicola gavialis*). Ophiodiplostomatidae are divided into the Ophiodiplostomatinae containing *Ophiodiplostomum*, *Heterodiplostomum* and *Petalodiplostomum*, and the Proalarioidinae n.subf. (synonym Travassosstominae) containing *Proalarioides*.

Two families of the Plagiorchioidea are revised in this volume, the Ommatobrephidae (which remain basically unchanged) and the Opisthognomimidae of which two subfamilies, Opisthognominae and Sticholecithinae are dealt with here, the third Liophistrematinae having been revised in volume XIV as a subfamily of Plagiorchidae. Skryabin & Antipin now basically accept Freitas' (1956) classification of the Opisthognomimidae who transferred Liophistrematinae into this family, but reject his Bierinae, retaining *Bieria* in the Liophistrematinae.

G. I. Pozniak

2788—SKRYABIN, K. I., SHIKHOBALOVA, N. P. & LAGODOVSKAYA, E. A., 1960.

[Principles of nematology, edited by K. I. Skryabin. Vol. VIII. Oxyurata of animals and man. Part 1.] Moscow: Izdatelstvo Akademii Nauk SSSR, 557 pp. [In Russian.]

This monographic revision of the suborder Oxyurata is to appear in several volumes. In this part Skryabin *et al.* analyse the broad classification of the suborder with particular reference to the work of Chabaud in 1957 and of Skryabin & Shikhobalova in 1951 [for abstracts see Helm. Abs., 29, No. 306 & 20, Nos. 942a & 1011] including in it the superfamilies Oxyuroidea, Cosmocercoidea, Subuluroidea, Atractoidea and Chabaud's Heterakoidea (which they subdivide into Heterakidae, Aspidoderidae, Strongyluridae and Spinicaudidae n.fam.), and revise one of the superfamilies, the Oxyuroidea.

Oxyuroidea contains five families. (i) The Oxyuridae are divided into Oxyurinae for genera parasitic in mammals and with the vulva in the anterior part of the body, i.e. *Oxyuris*, *Auchenacantha*, *Austroxyuris*, *Enterobius*, *Lobatorobius*, *Passalurus*, *Protozoophaga* and *Buckleyenterobius* (synonym *Odontorobius*, a genus erected by Skryabin & Shikhobalova who were not aware of Sandosham's genus), and Thelandroinae n.subf. for genera parasitic in amphibians and reptiles and with the vulva in the centre or the posterior part of the body, i.e. *Thelandros*, *Avilandros*, *Parapharyngodon* and *Thelastomoides*, genera with a spicule but without a gubernaculum previously in Pharyngodoninae. *Parapharyngodon brevicaudatus* n.comb., *P. cameroni* n.comb. and *P. taylori* n.comb. are made for species originally in *Thelandros*. The Travnematinae, although previously in Oxyuridae, have an attractoid type of oesophagus and are thus transferred to the Atractoidea as Travnematidae n.fam.

(ii) The Heteroxynematidae contain Heteroxynematinae, Acanthoxyurinae, Aspiculurinae and Labiostomatinae (containing only *Labiostomum*; *Cephaluris* being transferred to Acanthoxyurinae and *Eugenuris* to Aspiculurinae).

(iii) The Ozolaimidae are divided into the Ozolaiminae for forms with an anterior swelling of the oesophagus (*Ozolaimus*) and the Macraciinae n.subf. in which the oesophagus lacks an

anterior swelling (*Macracis*, *Mamillomacracis* and *Travassozolaimus*, genera with a characteristic gubernaculum and previously in Pharyngodonidae).

(iv) Pharyngodonidae only contains forms in which the spicule is absent or is rudimentary. The species originally in *Pharyngodon* are split into three groups: *Pharyngodon* for species with well-developed caudal alae forming a characteristic male bursa which encloses also the post-anal pair of pedunculated papillae (type *P. spinicauda* and 12 other species, eight species remaining in *Pharyngodon* s.l.); *Spauligodon* n.g. for species with well developed caudal alae forming a male bursa which encloses only the anterior pair of pedunculated papillae (type *S. extenuatus* n.comb., *S. auziensis* n.comb., *S. californiensis* n.comb., *S. cubensis* n.comb., *S. giganticus* n.comb., *S. laevicauda* n.comb., *S. mearnsi* n.comb., *S. oxkutzcabiensis* n.comb., *S. tarentolae* n.comb. and *S. tectipenis* n.comb.); and *Parathelandros* for species with lateral alae but in which caudal alae and pedunculated papillae are absent (type *P. mastigurus* and eight other species including *P. apapillosus* n.comb., *P. bassii* n.comb., *P. mabuiensis* n.comb., *P. mabuyae* n.comb. and *P. megalocerca* n.comb.).

(v) The Syphaciidae contain Syphaciinae, Laurotravassoxyurinae and Tachygonetriinae. In the Syphaciidae the authors agree with Chabaud & Biocca (1955) on the subdivision of *Syphacia* into two subgenera but change their specific composition transferring to subgenus *Syphacia* the species *S. sciuri* and *S. thompsoni* and also including *S. lahorea*, *S. montana* and *S. tineri*. Subgenus *Syphatineria* includes *Syphacia* sp. Ablasov, 1956, from *Sciurus vulgaris* in Kirgizia with a description and figure after Ablasov, 1956, which is stated to be published here for the first time. In the Tachygonetriinae they transfer two species of *Alaeuris* into *Pseudalaeuris* as *P. brachylophi* n.comb. and *P. yumanae* n.comb. G. I. Pozniak

## SUMMARY OF REPORTS

[Only those sections relating to helminthology are abstracted.]

### 2789—AUSTRALIA, 1960. "Report of the Queensland Department of Agriculture and Stock, 1959-60." Brisbane: Government Printer, 126 pp. [Helminths pp. 60, 73.]

The state-wide survey of nematodes is continuing. *Heterodera trifolii* has been reported from Australia for the first time; the necessary preliminary steps were taken to control an outbreak of *H. schachtii* in one locality. The Veterinary Services Branch reports that the relatively dry season diminished infections due to nematodes; considerable interest is being shown in the use of organic phosphorus compounds in the control of *Haemonchus*. J. W. Smith

### 2790—BRITAIN, 1961. "University of Birmingham. 31st annual report, 1959-60."

Birmingham: University Research Committee, 137 pp. [Helminths pp. 29, 32.]

Comparative studies of the functional morphology of the adhesive organs and the genitalia of amphibdellid parasites of electric rays and studies on the symmetry of the monogenean gill parasites of some common elasmobranch fishes have been carried out by the Department of Zoology and Comparative Physiology. The larva of *Hexabothrium appendiculatum* has been described for the first time. Fluctuations in the population of nematode-trapping fungi have been studied in the Department of Botany. Fungi apparently trap nematodes only when competing for the soil substrate with other micro-organisms; once the substrate is exhausted the presence of nematodes does not prolong predacious activity. J. W. Smith

### 2791—BRITAIN, 1961. "Report of the Nematology Department, Rothamsted Experimental Station, for 1960, by F. G. W. Jones." Harpenden: Rothamsted Experimental Station, pp. 129-138.

The work of the department on systematics and bionomics has included studies on the Mononchidae of New Zealand and on the morphology and variability of natural and cultured populations of *Meloidogyne* spp. *Aphelenchoides cocophilus* has been transferred to a new genus,



*Rhadinaphelenchus* and a new species, *M. artiellia* has been described from Norfolk. Investigations into the feeding mechanisms of various species have been carried out. Work on *Heterodera* spp. included further research into the chemical nature of the hatching factors obtained from various root diffusates, the biotypes of *H. rostochiensis*, the cytology of *H. galeopsidis* and the bionomics of *H. göttingiana*. The work on various nematocides which was recommenced in 1959 has continued. The revised text of T. Goodey's book "Soil and Fresh-water Nematodes" is almost complete, but many drawings still have to be done.

J. W. Smith

**2792—BRITAIN, 1961. "Report of the Agricultural Research Council for the year 1959-60."** London: H.M. Stationery Office, ix+209 pp.

This report contains an outline of the present state of knowledge regarding the role of nematodes in the transmission of tobacco rattle virus and the ringspot viruses as discussed at a recently-held symposium on soil-borne plant viruses. Helminthological work done at individual research stations was briefly as follows: (i) at Rothamsted Experimental Station on the development of special photographic techniques to record the movement and feeding of eelworms; (ii) at East Malling Research Station on the transmission of plant viruses by species of *Xiphinema* and *Longidorus*; and (iii) at the Animal Diseases Research Association studies on *Haemonchus contortus* infections in sheep, *Nippostrongylus muris* infections in rats and on the effects of temperature and humidity on the development of *Nematodirus battus* and *N. filicollis*.

J. W. Smith

**2793—CANADA, 1961. "Review of the National Research Council 1960."** Ottawa: National Research Council, 354 pp. [Helminths pp. 251-255.]

The Joint Committee on the Institute of Parasitology reports that activities in 1959 included research on: the determination of the conditions necessary for the development and survival of the free-living stages of parasitic nematodes; the effect of electrical stimuli on the neuromuscular systems of *Ascaris*, *Toxocara* and *Phocanema* (= *Porrocaecum decipiens*) and the physiology of the hatching of *Ascaris* eggs; more efficient methods of diagnosing *Trichinella spiralis* and hydatid cyst infections; the growth of hydatid cysts in artificial media; and the value of host specificity in classification. A monograph on the hookworms of snakes is nearing completion. The Associate Committee on Wildlife Research reports that studies on the life-cycle of *Dispharynx* have been carried out; *Oniscus ascellus* has been established as an experimental host for *D. nasuta*. The life-cycle of the filarioids of blue grouse have been studied; a new species of *Splendidofilaria* has been described.

J. W. Smith

**2794—EAST AFRICA, 1960. "East African Agriculture and Forestry Research Organization. Record of Research for 1959. Plant Nematology, by A. G. Whitehead."** Nairobi: Government Printer, pp. 49-54.

The survey of plant-parasitic nematodes of East Africa begun in 1956 has ended and is being written up. During the year work was done on the differences between the tylenchid fauna of indigenous forest, grass and cultivated soils; on the dynamics of a tylenchid complex of two soils under a range of crops; on the composition and population dynamics of the tylenchid fauna in a pyrethrum planting; and on the taxonomic study of *Meloidogyne*, *Helicotylenchus*, *Scutellonema*, *Gottholdsteiniera* and *Rotylenchus*.

G. I. Pozniak

**2795—EAST AFRICA, 1960. "East African Institute for Medical Research. Report, 1959-60."** Nairobi: East Africa High Commission, 36 pp. [Helminths pp. 22-34.]

At Kilwa, south of Dar es Salaam there is a high incidence of bancroftian filariasis; studies of the vector-parasite relationship have been carried out. Research into schistosomiasis by the Institute has included surveys of the incidence of infection amongst schoolchildren, the periodicity of schistosome egg output and intensity of infection and extensive field studies of the snail vectors including trials with molluscicides and observations of cercariae.

J. W. Smith

- 2796—INDIA, 1960. "Annual report (12th) of the Research Department of the Coffee Board, 1958-1959."** Bangalore: Director of Research, Coffee Research Station, 183 pp. [Helminths pp. 40, 75, 88-89, 93-94.]

Eelworms of coffee in South India are reported from estates in the Chikmagalur, Coorg, Mudigere, Mysore, Nilgiris and Suntikoppa zones. *Tylenchorhynchus* sp. was more abundant than *Radopholus similis*; predatory nematodes include *Mononchus* sp.; *Cephalobus* sp. and *Rhabditis* sp. were widely distributed. The results of trials with Nemagon on two estates commenced in 1957 were inconclusive. Further trials with Nemagon and with Nematicide V.C. 13, soil amendments, farmyard manure and Vapam are in progress. J. W. Smith

- 2797—IRELAND, 1961. "Annual report of the Minister for Agriculture (29th), 1959-60."** Dublin: Stationery Office, vi+138 pp.+Appendices [123] pp. [Helminths pp. 65-66, [29-30, 40-42].]

The Plant Sciences and Crop Husbandry Division reports that population, host-range and morphological studies of the eelworms of beet, cereal, lettuce, mushroom, onion, potato and strawberry has continued. The following helminths were encountered *inter alia* at the Veterinary College during routine examinations: *Ascaris* and redworms in horses; stomach worms in cattle, sheep and goats; and *Uncinaria* and *Toxocara* in cats and dogs. J. W. Smith

- 2798—JAMAICA, 1960. "Annual report of the Ministry of Agriculture and Lands for the year ended 31st December, 1958."** Kingston: Government Printer, 92 pp. [Helminths pp. 43, 61-62.]

Following the discovery of the association of *Radopholus* sp. with citrus and the outbreak of *R. similis* among bananas in 1957 it is feared that nematodes may be causing more damage to Jamaica's commercial crops than was hitherto suspected. The intermediate host of *Fasciola hepatica* in Jamaica has been identified as *Lymnaea cubensis*. J. W. Smith

- 2799—NORTHERN IRELAND, 1960. "Agricultural Research Institute of Northern Ireland. 33rd annual report, 1959-60."** Hillsborough, Co. Down: 47 pp. [Helminths pp. 24-25, 26-28.]

Young cattle infected with *Dictyocaulus viviparus* received no obvious benefits from treatment with diethylcarbamazine citrate. Further investigations have been carried out into the epidemiology of *Nematodirus* disease in ewes and lambs grazed by the set stocking method. J. W. Smith

- 2800—SCOTLAND, 1960. "Report on the work of the College for the year ended 30th September, 1960."** Glasgow: West of Scotland Agricultural College, 91 pp. [Helminths pp. 52, 55-57, 61, 64.]

During experimental investigations by the Plant Pathology Department into the validity of the idea of fixing a limit to the population of potato-root eelworm treatable by a given method, it was noticed that some eelworm eggs inside their cysts were attacked and destroyed by what appeared to be a parasite; this is being studied as a possible means of biological control. An experiment to assess the increased wastage of an eelworm population on ground planted with *Tagetes minuta* has been undertaken. *Meloidogyne incognita* on tomatoes in Lanarkshire and *M. javanica* on tomatoes and cucumber in Ayrshire are reported. *Aphelenchoides ritzema-bosi* attacking the leaves of *Asplenium nidus* is a new British record. The Veterinary Department reports that treatment of several outbreaks of *Ostertagia ostertagi* and *Nematodirus filicollis* in yearling stirks with phenothiazine and bephenium hydroxynaphthoate was unsuccessful. Other diseases of farm stock diagnosed during the year included *Chabertia ovina* infection, fascioliasis and black disease in sheep and lungworm and *Ascaris* infection in pigs. J. W. Smith



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In both indexes the reference is to the serial number of the abstract or to the page number (given in *italics*) of book reviews etc.

In the Author Index no distinction is made between abstract and title-only entries and there are no cross-references to show joint authorship. Thus a paper by "Brown, B., Jones, A. & Smith, J." would have three separate entries, "Brown, B.", "Jones, A.", and "Smith, J." but the serial numbers under the subsidiary authors are given in parentheses.

In the Subject Index numbers in bold type indicate abstracts and numbers in Roman type refer to title-only entries. Alphabetization is under the first word (e.g. "*Acer* sp." before "*Acerina* sp."). Under the generic name of a helminth the following order is observed: papers on the genus as such; papers on undefined species; papers on new and defined species, e.g.

*Capillaria*  
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— *aerophila*  
— *amarali* n.sp.

Hosts are indexed under their scientific names, where given, except domesticated animals (e.g. cat, pig, sheep), crop plants (e.g. oats, rye, tobacco), and where numerous hosts of the same group are listed in the one paper (e.g. amphibians, birds, cereals, legumes, mammals). The use of alternative scientific names for host or parasite is avoided wherever possible but in cases in which nomenclatorial or taxonomic confusion still exists the same organism may appear under more than one name.

*Anthelmintics* are listed alphabetically under that word, either by their trade name or by the active principle. There are no cross-references between proprietary drugs having the same or similar constituents and no classification of the drugs is attempted. They are also entered under the name of the parasite or disease and under the name of the host. For eelworms parasitic in or on plants they are entered alphabetically under *Nematicides* (*plant eelworm*) and under the name of the eelworm.

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| Ishihara, T. . . . .               | 43, 487   | Jiménez Millán, F. . . . .       | 1922                                      | Katiyar, R. D. . . . .            | 1508   |
| Ishii, T. . . . .                  | 313, 314  | Jiménez-Quirós, O. . . . .       | 17, 24, 488, (1741), (1743), 1757         | Katz, F. F. . . . .               | 363, 1962  |
| Ishikawa, M. . . . .               | 1988, 1989  | Jirovec, O. . . . .              | 681                                       | Kawagoe, K. . . . .               | 25   |
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| Iwakami, S. . . . .                | 1303, 1958  | Jones, jr., J. . . . .           | 1597                                      | Kent, H. N. . . . .               | 2694, 2695, (2721)   |
| Iwańczuk, I. . . . .               | 91, 1462  | Jones, L. M. . . . .             | 1231                                      | Keyna . . . . .                   | 2096   |
| Iwasaki, H. . . . .                | 1920, 1959, 1990  | Jones, L. P. . . . .             | (517)                                     | Keplinger, J. A. . . . .          | (410)  |
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1206 (Abstract)

Line 1 For "precepitation" read "precipitation"



## REPORTS OF MEETINGS

### **Netherlands Society for Parasitology**

THE FIRST MEETING of the Netherlands Society for Parasitology was held at Utrecht on 29th September 1961. Four papers of helminthological interest were read: "The outline of the parasitological field" by Prof. Dr. P. H. van Thiel, "The circum-oval precipitation reaction in experimental schistosomiasis" by Dr. C. F. A. Bruijning, "The vegetation in liver-fluke areas" by H. J. Over and "Some data on the therapy of trichostrongylosis in sheep" by Dr. J. Jansen. Dr. R. Boddeke showed his film on "The life-history of *Prosthogonimus ovatus*". J. Jansen, Jr.

### **Institute of Biology, Parasitology Group, Autumn Meeting, 1961**

THE AUTUMN MEETING of the Institute of Biology Parasitology Group was held on 10th November at the National Institute for Medical Research, Mill Hill, London, N.W.7. Six papers were read under the general title of "Parasites of World Importance" of which four were of helminthological interest, namely, "Veterinary Helminths" by Dr. E. L. Taylor, "Plant Nematodes" by Mr. F. G. W. Jones, "Schistosoma" by Dr. O. D. Standen, and "Simuliidae in relation to human onchocerciasis" by Dr. D. J. Lewis. Although each speaker was allowed only a comparatively short time to cover his subject interesting and illuminating accounts of the various fields were given by all and these were followed by stimulating discussions.

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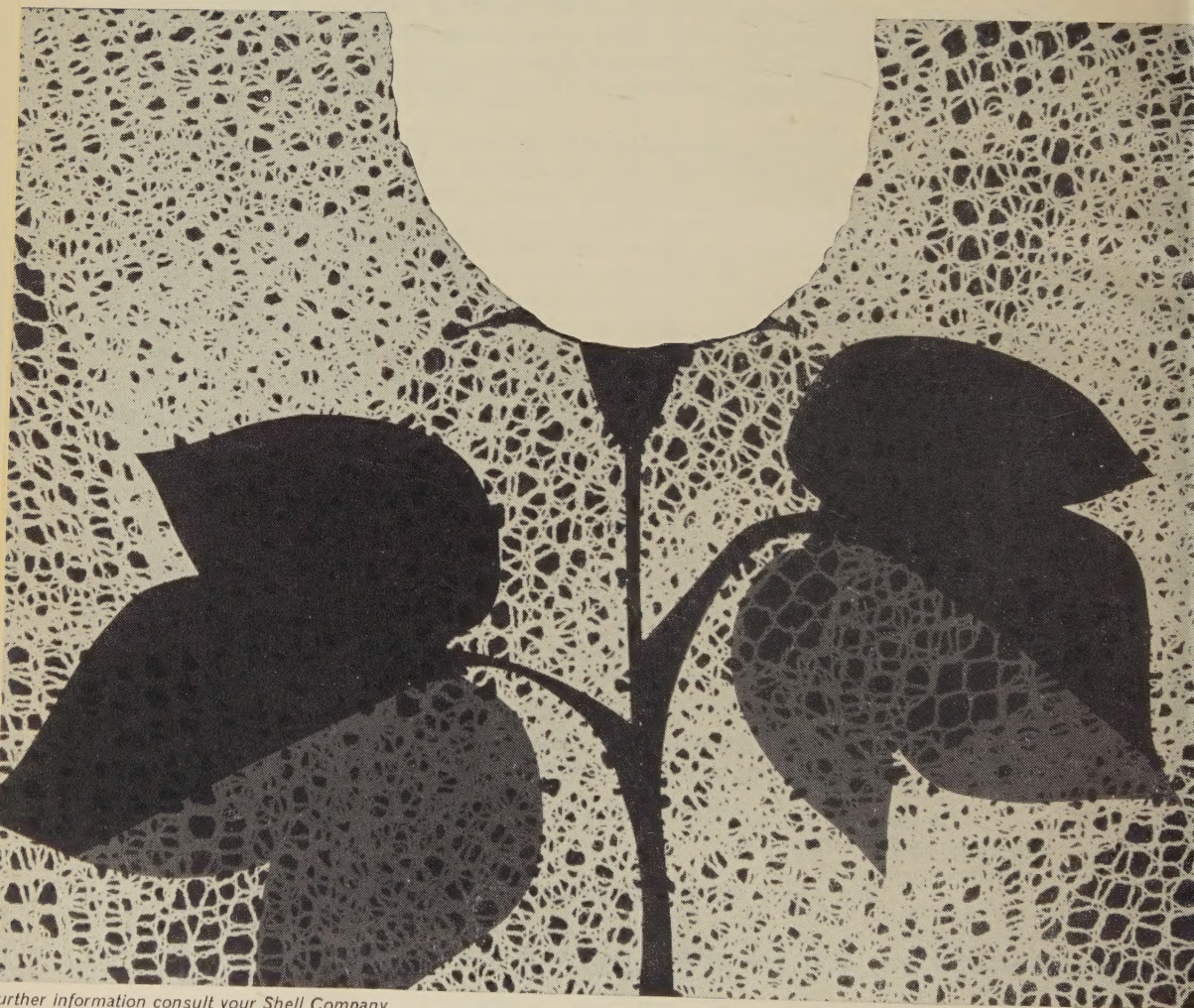
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